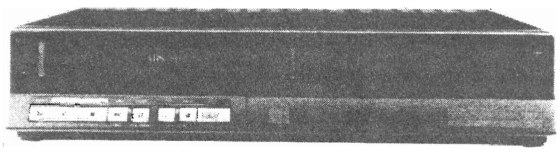
Video cassette recorder VR6843/56

Service
Service
Service

Multi-system VCR



Service Manual

VR6843/56 Is a video cassette recorder with a TV-reception part and electronic timer, suitable for recording and playing back TV signals, which meet the NTSC, PAL and SECAM standard. The signals are recorded on tape according to the VHS standard.

VHS
NTSC–PAL–SECAM

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Safety regulations require that the set be restored to its original condition and that parts which are identical with those specified be used.

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SPECIFICATIONS

– VR6843/56 –

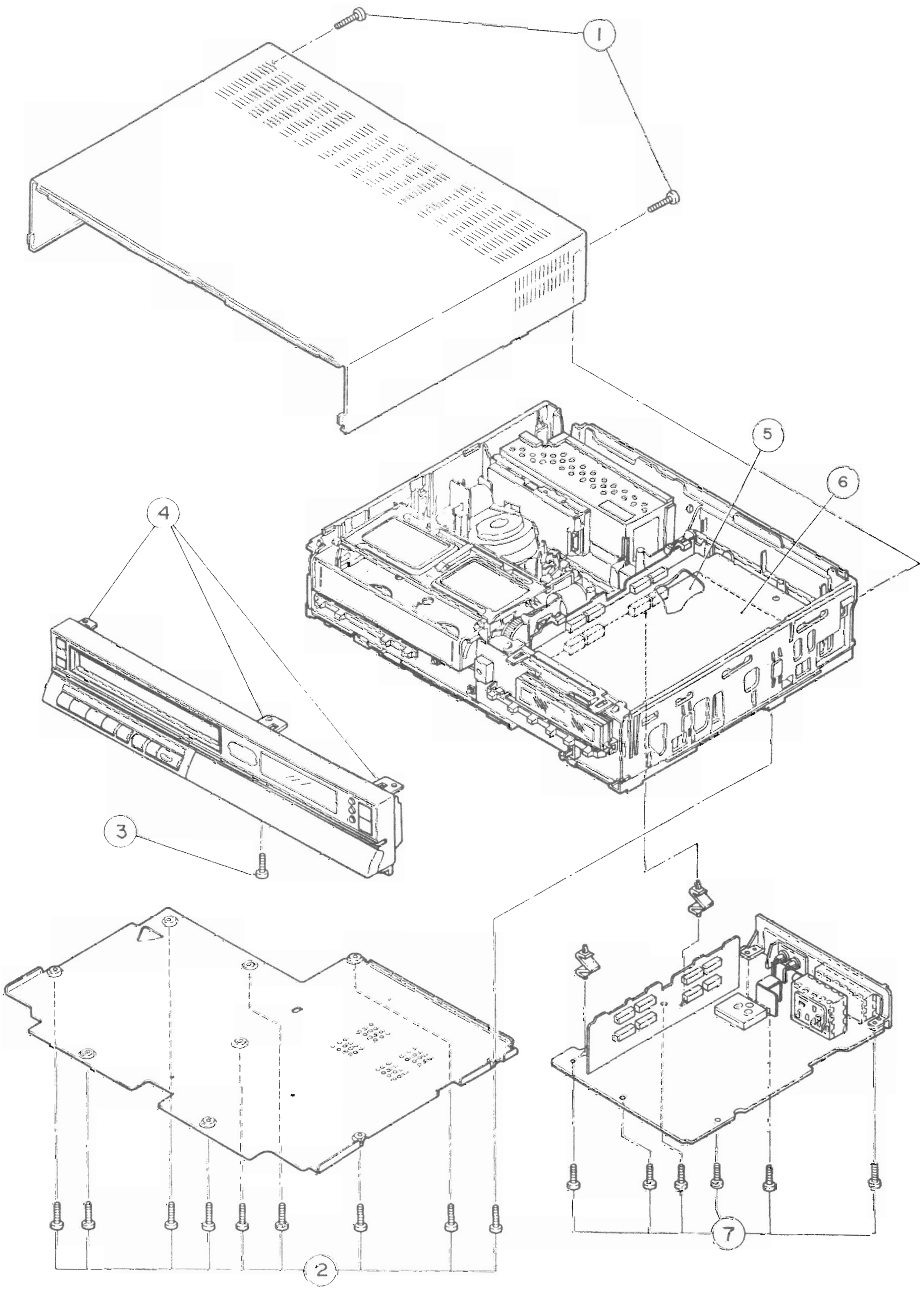
Format:	VHS standard
Video recording system:	Four rotary head helical scan system
Video signal:	PAL: PAL System-B/G (P.B/REC) PAL: PAL System-I (P.B/REC) PAL: PAL System-D (P.B/REC) SECAM: MESECAM System (P.B/REC) SECAM: SECAM System-B/G (P.B/REC) SECAM: SECAM System-D/K (P.B/REC) NTSC: NTSC4.43 (P.B/REC) NTSC: NTSC3.58 (P.B/REC)
Recording/playing time:	240 min max. with E-240 tape (PAL/MESECAM/SECAM in SP mode) 8 hours max. with E-240 tape (PAL/MESECAM/SECAM in LP mode) 160 min max. with T-160 tape (NTSC in SP mode) 8 hours max. with T-160 tape (NTSC in LP (EP) mode)
Tape width:	12.7 mm
Tape speed:	23.39 mm/sec. (PAL in SP mode) 33.34 mm/sec (NTSC in SP mode) 11.7 mm/sec (PAL in LP mode) 11.12 mm/sec (NTSC in LP (EP) mode)
Antenna:	75 ohm unbalanced
Receiving channel:	VHF CCIR I1 ~ S20 UHF E21 ~ M83
RF converter output signal:	UHF channel E30 ~ E39 (adjustable) Preset to ch E36
Power requirement:	AC 110V ~ 240V, AUTO 50/60Hz
Power consumption:	Approx. 31 W (with anti-dew heater)
Operating temperature:	5°C to 40°C
Storage temperature:	-20°C to 55°C
Weight:	6.5 kg
Dimensions:	430 mm (W) × 357 mm (D) × 93 mm (H)
VIDEO	
Input:	1.0 Vp-p, 75 Ω
Output:	1.0 Vp-p, 75 Ω
AUDIO	0 dB = 0.775 Vrms
Input:	Line: -8 dB, more than 50 kΩ
Output:	Line: -5 dB, less than 1 kΩ
Accessories included:	Antenna 75 Ω coaxial connector cable (plug provided) Remote control unit Operation manual, Screwdriver

As part of our policy of continuous improvement, we reserve the right to alter design and specifications without notice.

Note: The antenna must correspond to the new standard DIN 45325 (IEC 169-2) for combined VHF/UHF antenna with 75 Ω connector.

REMOVAL OF MAIN PARTS

■ Printed Wiring Board Removal



① Remove the two screws from the top cabinet.

② Remove the nine screws from the bottom plate.

③ Remove the one screw from the front panel.

④ Remove the three clips of the front panel and remove the front panel.

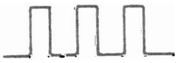
⑤ Remove the three screws from the syscon/servo PWB.

⑥ Remove the two screws from the YC/Audio PWB.

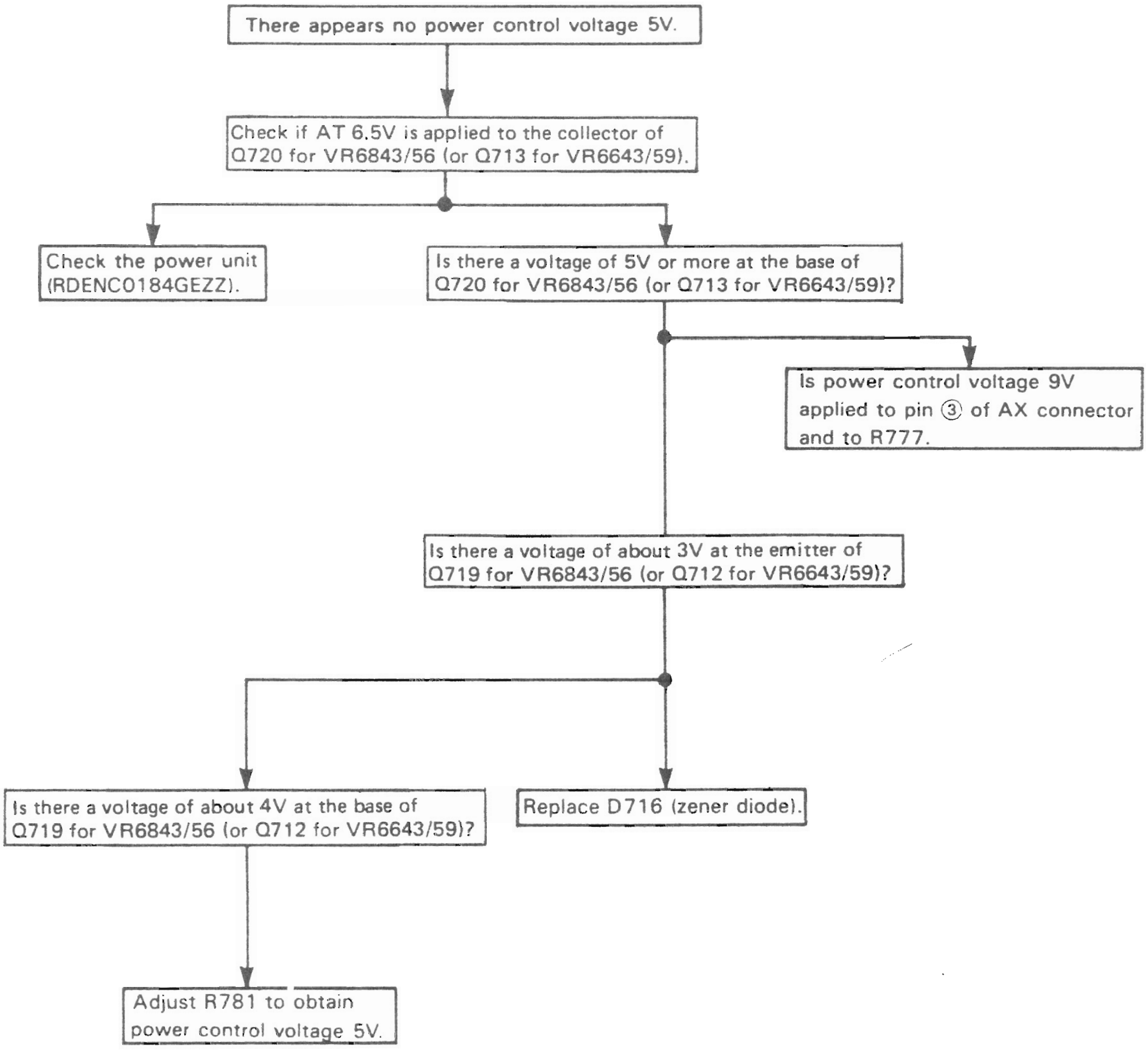
⑦ Remove the six screws from the main PWB.

TROUBLESHOOTING GUIDE

■ TROUBLES OF POWER UNIT

No.	Problems	Probable causes and countermeasures
1.	AT 15V output is not applied.	Check the following points: • See if F903 is broken. • See if L903 is broken. • See if D914 functions properly.
2.	AT 6.5V output is not applied.	Check the following points: • See if F902 is broken. • See if L904 is broken. • See if D915 functions properly.
3.	AT 45V output is not applied.	Check the following points: • See if R914 is broken. • See if D916 functions properly.
4	AT −30V output is not applied.	Check the following points: • See if R911 broken. • See if L902 is broken. • See if Q902 and its peripheral parts function properly.
5.	No voltage is supplied along all the lines. (Complete power-off)	a) First check the above items 1 thru 4. b) Check to see if F901 is broken. c) See if ICP901 is broken. d) See if R902 is broken. e) See if F904 is broken. f) When no problem is found in the above steps a) thru e), check to see if the switching signal, as shown below, is given between pin ② and pin ④ of IC901.  If the signal is not given, replace the IC901 with a new one and check its peripheral parts (capacitors, resistors and diodes). Note: The primary (hot) circuit is switched on and off at high voltage. While checking, be very careful not to touch the circuit to keep off an electric shock.

■ Power control voltage 5V


There appears no power control voltage 5V.
Check if AT 6.5V is applied to the collector of Q720 for VR6843/56 (or Q713 for VR6643/59).
Check the power unit (RDENC0184GEZZ).
Is there a voltage of 5V or more at the base of Q720 for VR6843/56 (or Q713 for VR6643/59)?
Is power control voltage 9V applied to pin ③ of AX connector and to R777.
Is there a voltage of about 3V at the emitter of Q719 for VR6843/56 (or Q712 for VR6643/59)?
Is there a voltage of about 4V at the base of Q719 for VR6843/56 (or Q712 for VR6643/59)?
Replace D716 (zener diode).
Adjust R781 to obtain power control voltage 5V.

■ TROUBLES OF CONTROL SYSTEM (SYSTEM CONTROLLER CIRCUIT)

No.	Problems	Probable causes and countermeasures
1.	No power is supplied.	• The fuse is blown out; check if there occurs a short-circuit in the internal circuit. • Check if there are produced AT15V and AT6.5V in the power circuit; if not, this means that the power circuit is defective. • Check if the system controller (IC801) is normally functioning; check if there are produced reset signal at pin ⑨ of IC801 and clock signal at pin ⑩ of IC801. • Check if the power control signal (High) goes out of pin (52) of IC801.
2.	No operation is available.	• Check if the start sensor signal and end sensor signal are applied to pin ⑱ and pin ⑰ of IC801 respectively. • Check if the unit is in timer mode. • Check if the unit is in sensor stop mode. • The cam switch is poorly adjusted for its positioning. • Check if the key input voltage is as specified.
3.	After tape loading, the unit is stopped with the tape kept wound over the drum, or the cassette can't be ejected.	• The cam switch is poorly adjusted for its positioning. • IC803 is defective. • Capstan motor control circuit is defective.
4.	The unit will stop immediately after it is set in playback or record mode.	• Check if the head switching pulse is applied to pin ㉒ (for the drum sensor) of IC801. • Check if the drum motor is rotating. • Check if the drum phase generator's signal is applied to pin ⑰ of the servo circuit (IC703).
5.	The unit will stop a few seconds after it has been set in playback or record mode, or the tape running will stop on the way.	• Check if the reel pulse is applied to pin ㉑ (for the reel sensor) of IC801. • Check if the reel disk is rotating. • Check if the reel idler is not stained nor defective.
6.	The tape is not running (the tape is not taken up.)	• The capstan motor and/or reel idler is defective. • The reel brake is defective.
7.	The unit stops sometimes during playback or recording.	• Check if there is produced capstan mute signal at pin ㉟ of IC801.
	The tape can't be taken up when tape unloading.	• Check if there are reel sensor signal and drum sensor signal applied to pins ㉑ and ㉒ of IC801 respectively.
	The tape is scratched when it is wound video search is impossible.	• Check if there is produced capstan motor rotation signal (reverse) at pin ㉞ of IC801 when tape unloading. • Check if pins ㉙ and ㉚ of IC801 (servo mode signal) are at their proper level. • Check if there are proper voltages at pins ⑲ , ⑳ , ㉑ and ㉒ of IC702 when the unit is in the video search mode.

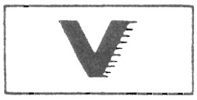
■ TROUBLES OF CONTROL SYSTEM (SERVO CIRCUIT)

No.	Problems	Probable causes and countermeasures
1.	Capstan motor is not rotating. • When the unit is in playback or record mode, there is no reel pulse produced (to disable the reel take-up operation) so that the microcomputer in the system controller gets in stop mode when some length of time has elapsed.	• There is not clock signal (4.43MHz and/or 3.58MHz) at pin ⑮ of IC702 (main servo IC) or the output level of clock signal, if exists, is insufficient. **Note:** When measuring the output of pin ⑮ of IC702, the probe of oscilloscope in use must be of low capacitance, or the measurement will be inaccurate. 1. Check if PC5.1V and AT5V are as specified. 2. Check if the chroma circuit and switching circuit are normally functioning. Also check if their signal output level is normal. 3. Check for voltage of Q713 for VR6843/56 (or Q707 for VR6643/59). • Capstan motor drive voltage is higher or lower than specified (with AT15V being as specified). 1. Check if vertical reference voltage is about 2.5V (at pin ⑥ of AB connector). If so, check for operation of the capstan motor. 2. Check if current limiter voltage is about 0.8V (at pin ③ of AB connector). If so, check for operation of the capstan motor. 3. Check if capstan motor control voltage is about 3V (at pin ④ of AB connector). If so, check if vertical reference voltage is as specified (at pin ⑮ of IC7001 for VR6843/56 or pin ⑦ of IC706 for VR6643/59); check if output voltages at pins ⑧, ⑩ and ⑪ of IC701 are all normal. • The voltage for capstan motor reverse rotation is not as specified (at pin ⑨ of AB connector). In this case, check for the system controller (IC801 and IC7001).
2.	Capstan motor rotates at higher speed than specified.	• There appears no capstan frequency generator's signal. 1. Check for the capstan motor. 2. Check for the circuit around IC701. • There is produced no capstan PWM (pulse width modulation) pulse. 1. Check for mode 1, mode 2 and VSC (video search control) 0 to 3 (at pins ⑩, ⑪, ⑲ to ㉒ of IC702). 2. Check for IC705 and IC702.
3.	Capstan motor rotates at lower speed than specified.	• Playback speed detection circuit functions incorrectly (there is High level output at pin ⑥ or ⑦ of IC701). 1. Check for output voltages at pins ② to ⑧ of IC703 (playback control amplifier).

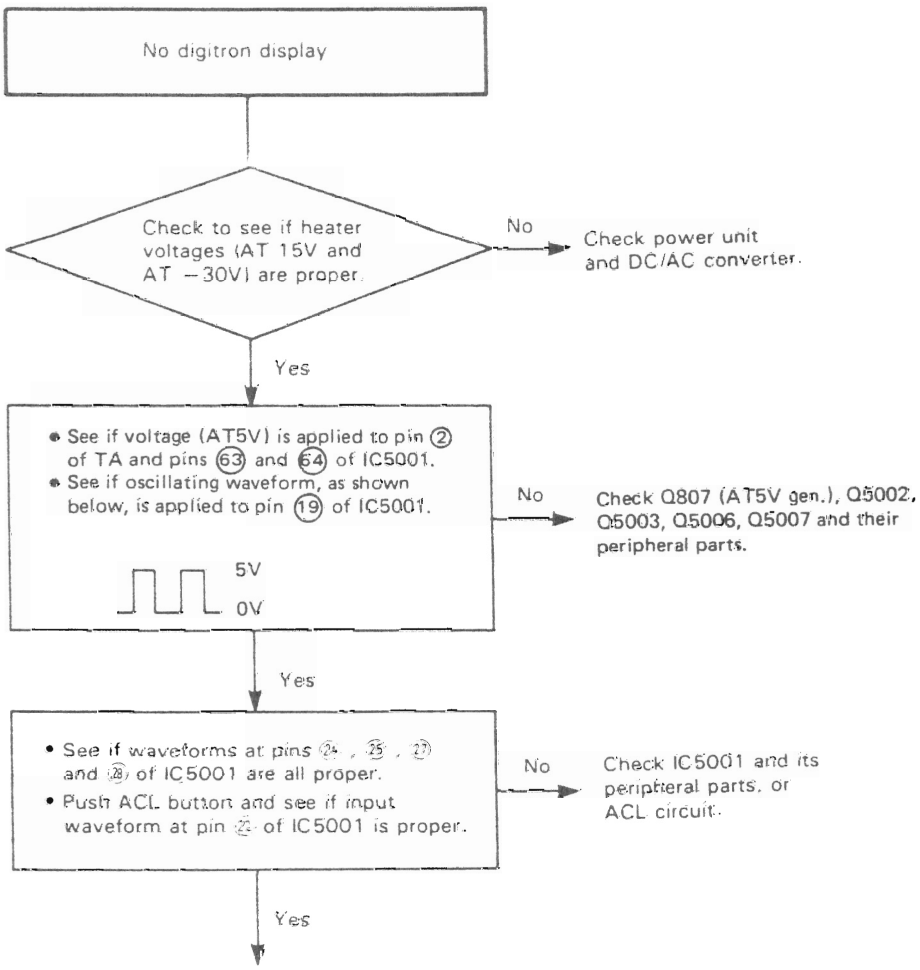
No.	Problems	Probable causes and countermeasures
4.	Noise appears at reproduced picture periodically.	• Capstan servo circuit is defective. 1. Check for the loop in which playback control signal is flowing. 2. Check if there is vertical sync signal (tracking monomultivibrator) at pin ⑩ of IC703. 3. Check for the loop in which capstan AFC/APC, PWM, LPF and DC amplifier are arranged.
5.	Horizontal bar (noise) appears at the lower part of reprocued picture.	• Playback phase is misadjusted. 1. Check for R748, R750, R752 and R754.
6.	Picture flows horizontally.	• This phenomenon does not occur in the compulsive mode. 1. Check and readjust the sync separator and 50Hz/60Hz discriminator circuit. 2. Check the 50Hz/60Hz selection line and the position of SW8113. (High level at 60Hz line, etc.) • Picture flows horizontally at any mode. 1. Check the drum servo block (drum FG amplifier, clock frequency, output voltage, drum motor control amplifier and drum motor).
7.	Slow operation and frame advance are not available. (VR6843/56)	• Check if there is frame advance pulse at pin ④ of IC7001. • Check if still/slow pulse (Low level) is applied to pin ㉒ of IC702. • Check if clock signal (about 1 Vp-p) is applied to pin ⑬ of IC7001. • Check if square wave (capstan FG waveform) is applied to pin ⑥ of IC7001 when capstan motor is in motion. • Check if there is a normal voltage at pin ㉘ (capstan motor's current limiter control) of IC7001.
	Still operation is not available. (VR6643/59)	• Check if there is frame advance pulse at pin ④ of IC7001. • Check if still pulse (Low level) is applied to pin ㉒ of IC702. • Check if ramp wave (mono-multi waveform) is applied to pin ⑯ of IC7001. • Check if there is a normal voltage at pin ⑫ (capstan motor drive) of IC7001.

■ TROUBLES OF SOUND AND REPRODUCED PICTURE (Y/C AND AUDIO CIRCUIT)

No.	Problems		Probable causes and countermeasures
1.	No picture appears.	At E-E mode	• Check if the video signal (E-E signal) is applied to pin ④ of IC201, and if it goes out of pin ⑩ . • Check if there is a normal voltage at each pin of IC201.
		At playback of standard tape	• Make sure that there appears a normal picture at E-E mode. • Check if playback FM signal is applied to pin ⑱ of IC401. • Check if playback FM signal is reproduced at pin ㉑ of IC301 for VR6843/56 (or pin ⑬ of IC301 for VR6643/59).
		At playback of the tape record by oneself.	Before this checking, make sure that normal playback is possible with standard tape. • Check if there is playback FM signal at pin ⑱ of IC401. • Check if there is video signal at pin ㉕ of IC401 and pin ⑩ of IC201.

No.	Problems	Probable causes and countermeasures
2.	No colour appears.	• Check if there is playback chroma signal at pin ㉒ of IC501. • Check if APC and/or AFC is not misadjusted. If it is not allowed to readjust them, this means that IC501 is defective. • Check if there is a normal voltage at each pin of IC501.
3.	The picture collapses when the tape recorded by oneself is played back. 	• Check if there is a normal voltage at each pin of head amplifier. • Check if record current is not misadjusted. • Check if deviation level, FM frequency and white/dark clip level are not misadjusted.
4.		• Check if video head is not choked. • Check if head amplifier is set at proper position. • Check if head switching pulse is normal.
5.	Noise is noticeable at E-E mode or when the tape recorded by oneself is played back.	• Tuner and/or RF converter is defective. • Check if R1570 (RF AGC control) is not misadjusted.
6.	Noise is noticeable when the standard tape is played back.	• Clean the video head or replace it with a new one.
7.	There appears no E-E sound.	• Check if there appears audio signal at pin ③ of IC1501. • Check if audio signal is applied to pin ① of IC601 and goes out of pin ⑨. • ALC is defective (D603, C606). • Check if the audio muting circuit is normally operating.
8.	There appears much of audio noise at E-E mode.	• Check if RF converter and audio switching circuit are normally operating. • Check if FL1502 and FL1503 are normally operating.
9.	There appears no sound at playback mode.	• The audio head is defective. • Check if playback signal is applied to pin ⑯ of IC601 and goes out of pin ⑨.
10.	Sound is distorted.	• The audio head is magnetized or defective. • Bias current is insufficient.
11.	Record/Playback sensitivity is low.	• The audio head is magnetized or defective. • The bias circuit is not operating.
12.	Recording is not possible.	• The bias circuit is not operating.
13.	There appears much of hum and noise.	• The audio head is defective.

■ Digitron display of timer circuit



No digitron display

Check to see if heater voltages (AT 15V and AT −30V) are proper.

Check power unit and DC/AC converter.

- See if voltage (AT5V) is applied to pin ② of TA and pins (63) and (64) of IC5001.
- See if oscillating waveform, as shown below, is applied to pin ⑲ of IC5001.

Check Q807 (AT5V gen.), Q5002, Q5003, Q5006, Q5007 and their peripheral parts.

- See if waveforms at pins ㉔, ㉕, ㉗ and ㉘ of IC5001 are all proper.
- Push ACL button and see if input waveform at pin ㉒ of IC5001 is proper.

Check IC5001 and its peripheral parts, or ACL circuit.

Now check the following points.

- System control serial data (TA10)
- Timer serial clock (TA9)
- Timer serial data (TA7)
- Timer ready data (TA8)
- Key matrix unit (KE1 − KE4) input waveform

MECHANICAL DRIVE SECTION NAMES OF PARTS

• TOP VIEW

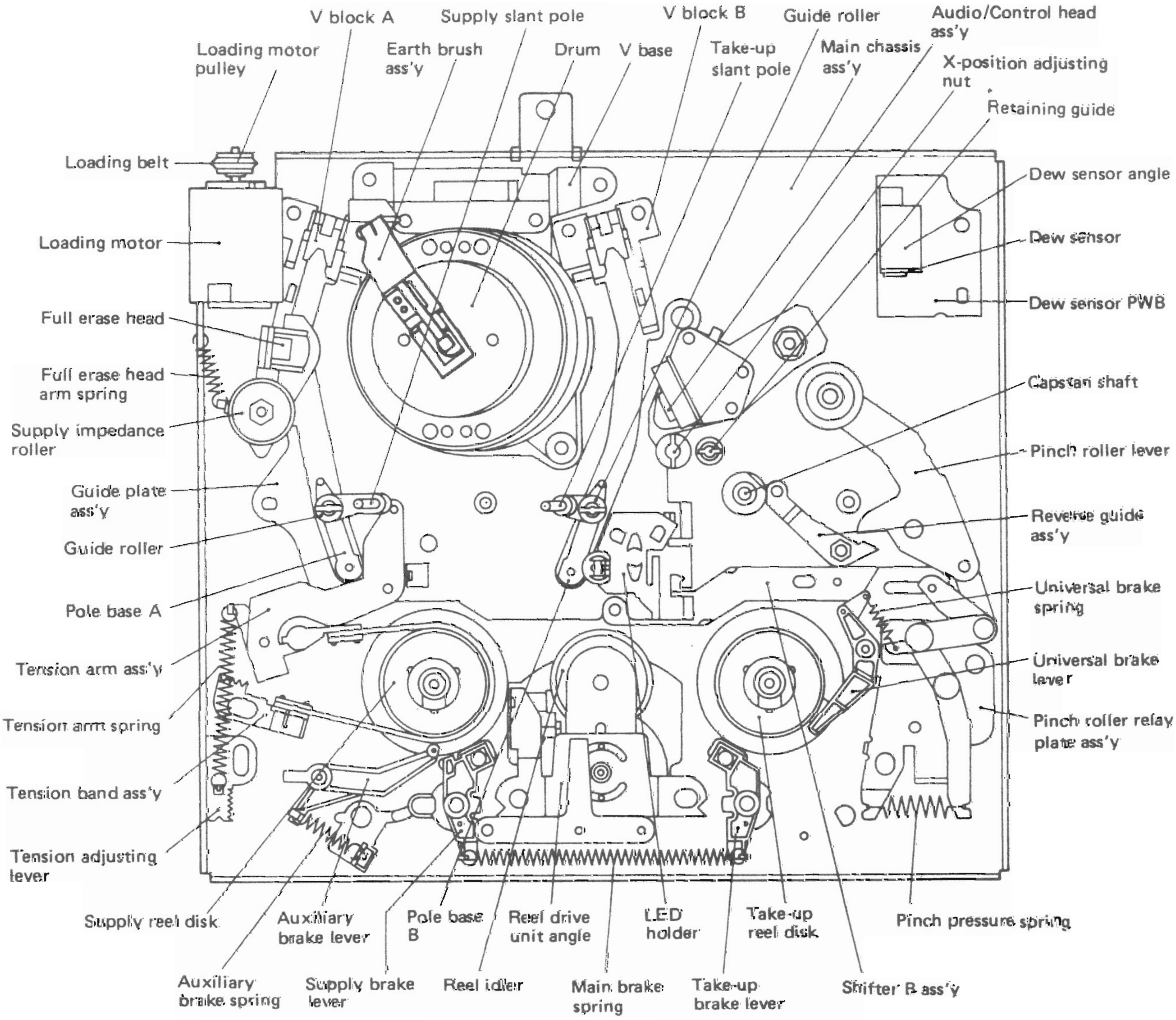


Figure 1-2.

• BOTTOM VIEW

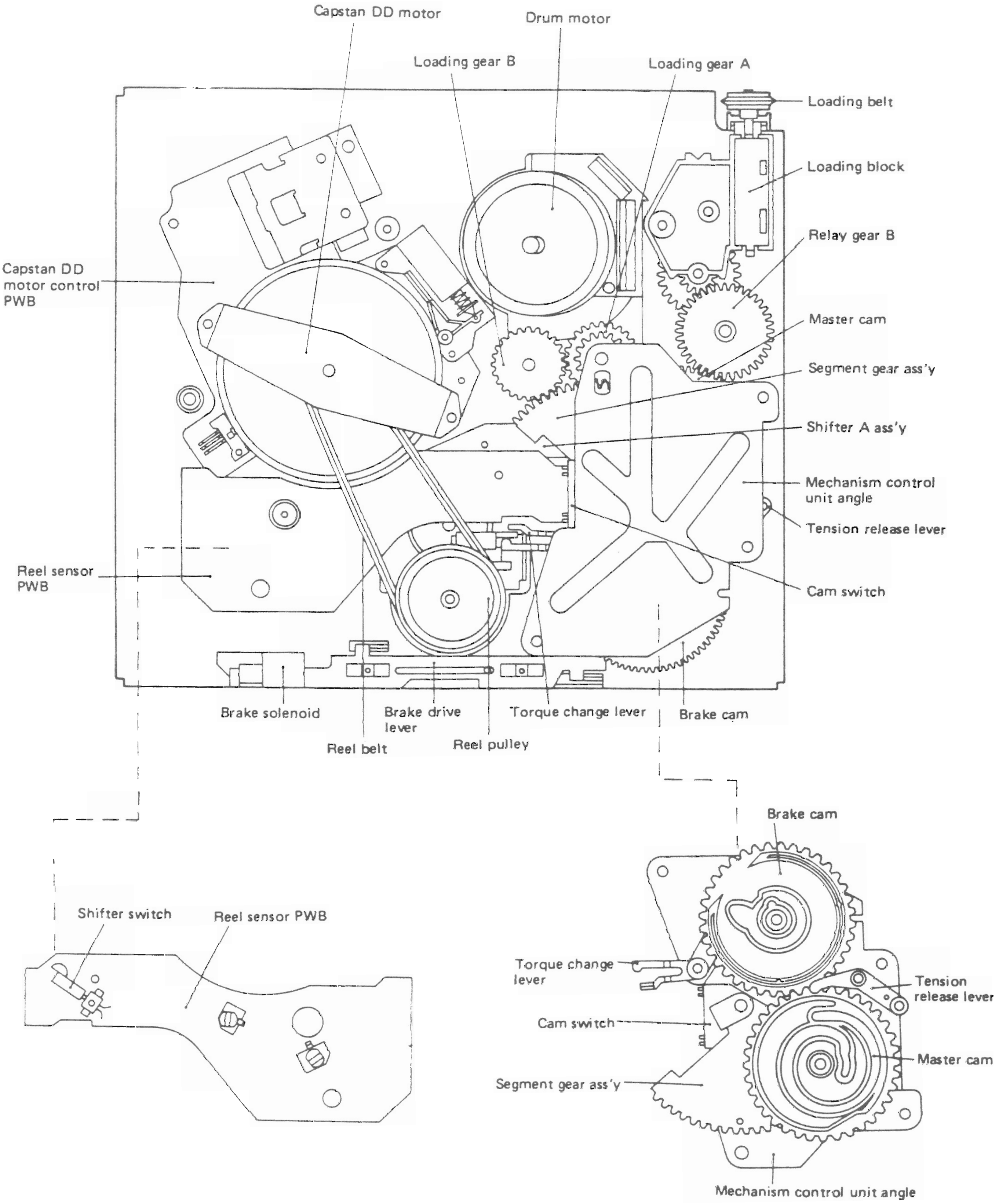
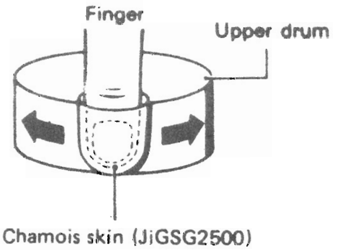
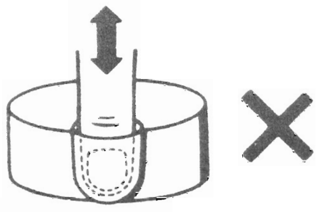


Figure 1-3.

Procedure	Remark
1. Put on a glove (thin type) so as to avoid touching the upper drum and lower drum with bare hand. 2. Give a few drops of alcohol to a chamois skin, and by lightly putting it against the head tip, allow the upper drum to turn to right and left 4 to 5 times.  Figure 1-5.	1. The video head is of very hard material, but since it is very thin, it should be absolutely avoided to clean it vertically.  Figure 1-6. 2. Wait for the cleaned part to be dried well, before operating the unit. 3. Do not reuse the stained chamois skin.

C. LEANING OF AUDIO CONTROL HEAD

Before the cleaning, open the upper cabinet according to the instructions given on Page 3.

The following shows in which positions the audio/control head and tape running parts are located respectively.

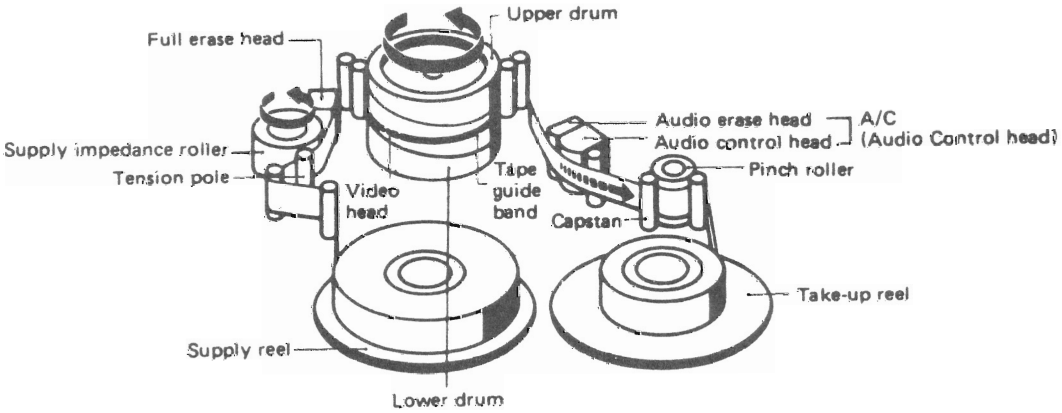


Figure 1-7.

cedure

a few drops of alcohol to a chamois skin, and by g it, clean up the audio control head: at the time, careful not to damage the upper drum and other running parts.

VR6843/56

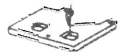
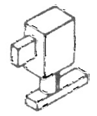
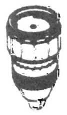
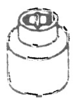
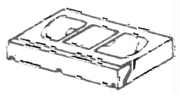
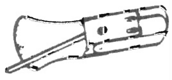
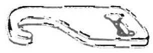
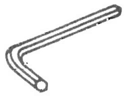
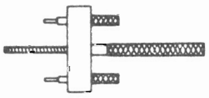
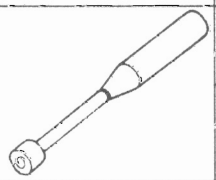
ADJUSTMENT, REPLACEMENT, ASSEMBLY AND CLEANING OF MECHANICAL UNITS

Here we will describe a relatively simpler service work in the field, not referring to the more complicated repairs which would require the use of special equipment and tools (drum assembly or replacement, for example).

We are sure that the easy-to-handle tools listed below would be more than handy for periodical maintenance to keep the machine in its original efficient condition.

■ TOOLS NECESSARY FOR ADJUSTING MECHANICAL UNITS

The following tools are required for proper service and satisfactory repair.

	Jig Item.	Part No.	Code	Configuration	Remarks
1	Master plane and reel disk height adjusting jig.	JiGRH0002	BR		These jigs are used for checking and adjusting of relative mechanical heights between reel disk and stay.
		JiGMP0001	BY		
2	Audio/Control head tilt adjusting jig.	JiGACH51B	BU		This jig is used for height adjustment of the running tape.
3	Torque gauge (90g.cm)	JiGTG0090	CM		These jigs are used for checking and adjusting the torque of take up and supply reels.
	Torque gauge (1.2kg.cm)	JiGTG1200	CN		
4	Gauge head	JiGTH0006	AW		
5	Torque cassette meter	JiGVHT-063	CZ		Torque cassette meter can be used to measure take-up reel torque in the playback and recording mode as well as back tension.
6	Tension gauge (300g)	JiGSG0300	BF		There are several gauges used for the tension measurements.
	Tension gauge (2.0kg)	JiGSG2000	BS		
7	Tension gauge adapter	JiGADP003	BK		This jig is used for the tension gauge.
8	Hexagon wrench (0.9 mm)	JiGHW0009	AE		These jigs are used for loosening or tightening special hexagon type screws.
	Hexagon wrench (1.2 mm)	JiGHW0012	AE		
	Hexagon wrench (1.5 mm)	JiGHW0015	AE		
9	Drum replacement jig	JiGDT-0001 or JiGDT-0001CD	BG AZ		This jig is used for the replacement of video cassette recorder's upper drum.
10	Box driver	JiGDRiVER110-7	AS		This jig is used for height adjustment of the audio/control head.
		JiGDRiVER11055	AR		This jig is used for adjustment of the supply impedance roller and reverse guide.

VR6843/56

ADJUSTMENT, REPLACEMENT, ASSEMBLY AND CLEANING OF MECHANICAL UNITS

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■ TOOLS NECESSARY FOR ADJUSTING MECHANICAL UNITS

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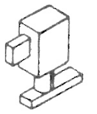
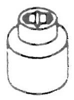
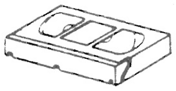
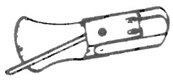
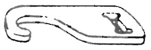
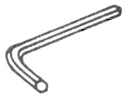
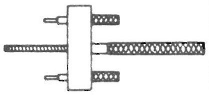
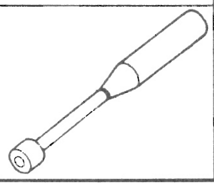
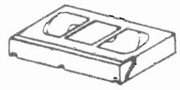
	Jig Item.	Part No.	Code	Configuration	Remarks
1	Master plane and reel disk height adjusting jig.	JiGRH0002	BR		These jigs are used for checking and adjusting of relative mechanical heights between reel disk and stay.
		JiGMP0001	BY		
2	Audio/Control head tilt adjusting jig.	JiGACH51B	BU		This jig is used for height adjustment of the running tape.
3	Torque gauge (90g.cm)	JiGTG0090	CM		These jigs are used for checking and adjusting the torque of take up and supply reels.
	Torque gauge (1.2kg.cm)	JiGTG1200	CN		
4	Gauge head	JiGTH0006	AW		
5	Torque cassette meter	JiGVHT-063	CZ		Torque cassette meter can be used to measure take-up reel torque in the playback and recording mode as well as back tension.
6	Tension gauge (300g)	JiGSG0300	BF		There are several gauges used for the tension measurements.
	Tension gauge (2.0kg)	JiGSG2000	BS		
7	Tension gauge adapter	JiGADP003	BK		This jig is used for the tension gauge.
8	Hexagon wrench (0.9 mm)	JiGHW0009	AE		These jigs are used for loosening or tightening special hexagon type screws.
	Hexagon wrench (1.2 mm)	JiGHW0012	AE		
	Hexagon wrench (1.5 mm)	JiGHW0015	AE		
9	Drum replacement jig	JiGDT-0001 or JiGDT-0001CD	BG AZ		This jig is used for the replacement of video cassette recorder's upper drum.
10	Box driver	JiGDRiVER110-7	AS		This jig is used for height adjustment of the audio/control head.
		JiGDRiVER11055	AR		This jig is used for adjustment of the supply impedance roller and reverse guide.

	Jig Item.	Part No.	Code	Configuration	Remarks
11	Alignment tape cassette	VR6CPSV	CK		This tape is especially used for electrical adjustment.
12	Special bladed screwdriver	JiGDRiVERH-4	AP		This screwdriver is used for adjusting the guide roller height.
13	Torque driver	JiGTD1200	CB		When screwing is needed at the resin-made part, be sure to use this torque driver: the specified torque is 5 kg.
14	Tension band and plate adjusting driver	JiGDRiVER-6	BM		This jig is used for adjusting tension band and tension plate.

NOTE:
Current JiGMA0001 contains master plane (JiGMP0001) and disk height adjusting jig (JiGRH0001). Even though new disk height adjusting jig (JiGRH0002) covers wider height, this new jig (JiGRH0002) can be used for current JiGRH0001, current jig (JiGRH0001) cannot be used as JiGRH0002. Master plane (JiGMP0001) can be used with JiGRH0001, and also JiGRH0002.

Description	part-no.	Ordering-code
Height adjusting jig	JIGRH0002	4822 395 80215
Master plane	JIGMP001	4822 395 80193
A/ head tilt jig	JIGACH51B	4822 395 80212
Fixed guide adjusting jig	JIGGH51B	4822 395 80214
Torque gauge 90 gcm	JIGTG0090	4822 395 80196
Torque gauge 1200 gcm	JIGTG1200	4822 395 80197
Gauge head	JIGTH0006	4822 395 80198
Torque cassette	JIGVHT-063	4822 395 80217
Tension gauge 300g	JIGSG0300	4822 395 80194
Tension gauge 2000g	JIGSG2000	4822 395 80216
Gauge adaptor	JIGADP003	4822 395 80213
Hex wrench 0.9 mm	JIGHW0009	4822 395 80189
Hex wrench 1.2 mm	JIGHW0012	4822 395 80191
Hex wrench 1.5 mm	JIGHW0015	4822 395 80192
Drum replacement jig	JIGDT-0001	4822 395 80186
Box driver 4	JIGDRIVER 110-4	4822 395 50192
Box driver 5.5	JIGDRIVER 11055	4822 395 50193
Alignment tape PAL	VROCPSV	4822 397 30107
Alignment tape NTSC	VROATSV	4822 397 30133
Alignment tape SECAM	VROCSSV	4822 397 30158
Screw driver	JIGDRIVER-4	4822 395 50189
Torque driver	JIGTD1200	5322 395 54047
Tension band adj.	JIGDRIVER-6	4822 395 50191

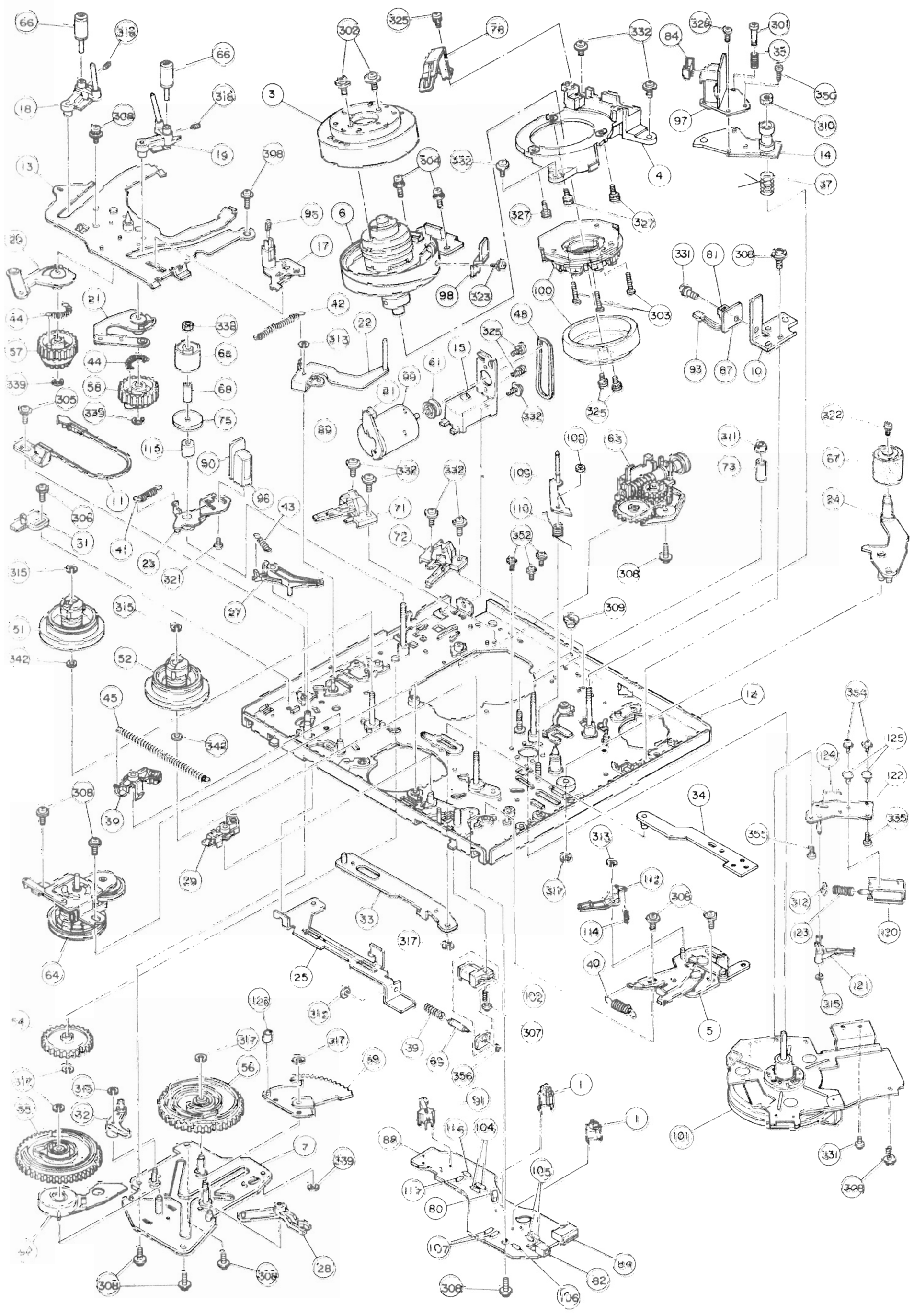
■ PREVENTIVE CHECKS AND SERVICE INTERVALS

The following intervals for checks and servicing should be observed in order to maintain the high quality of mechanical components.

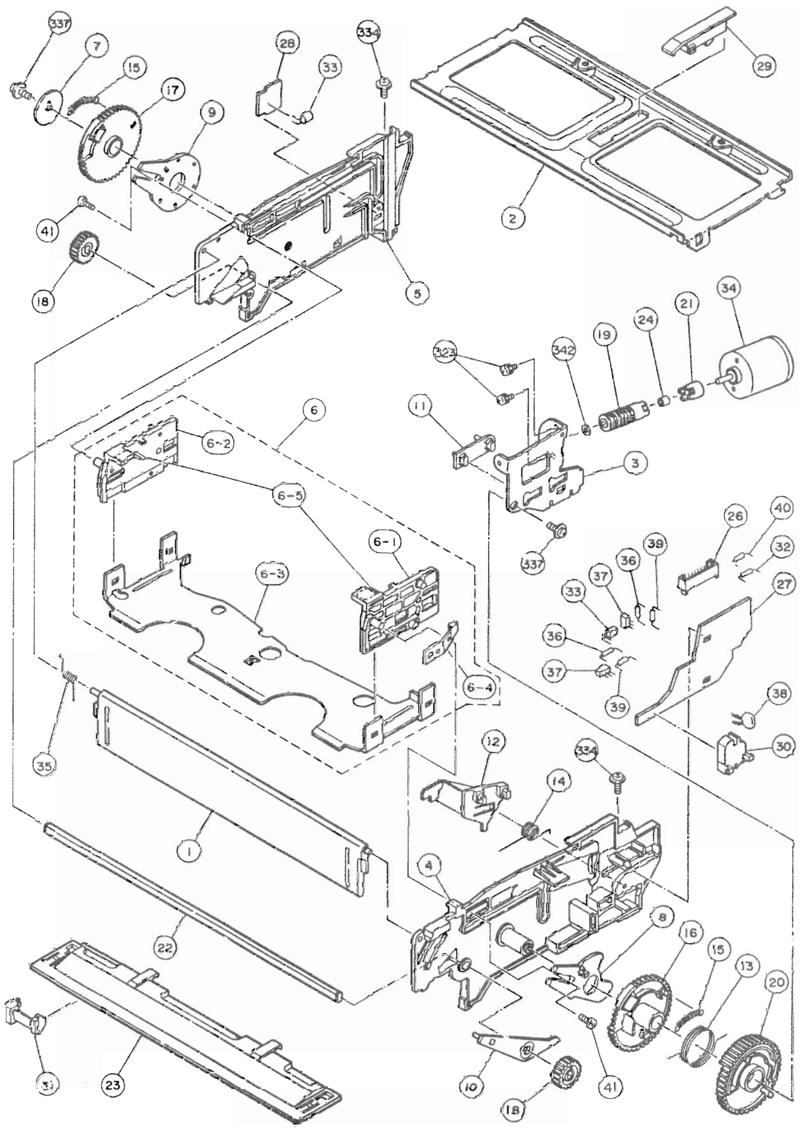
Maintained every Parts	500 hrs.	1000 hrs.	1500 hrs.	2000 hrs.	3000 hrs.	Remarks
Guide roller ass'y	□	□	□	□	□	Abnormal rotation or significant vibration requires replacement.
Supply impedance roller	□	□	□	□	□	
Supply impedance roller (inner)		□		□	□	Clean with industrial-grade methyl alcohol.
Supply impedance roller flange B	□	□	□	□	□	Clean tape contact area with the specified cleaning liquid.
Retaining guide	□	□	□	□	□	
Guide flange B	□	□	□	□	□	
Slant pole	□	□	□	□	□	
Video head	□	○□	□	○□	○□	Clean tape contact area with the specified cleaning liquid.
Full erase head	□	□	□	□	□	
Audio/Control head	□	□	□	□	□	
Pinch roller	□	□	□	□	○□	Clean rubber and rubber contact area with the specified cleaning liquid.
Reel belt		□		○		
Loading belt		□		○		
Capstan D.D. motor				○		
Loading motor				○		
Supply/Take-up reel disks		□△		□△		Clean with industrial-grade methyl alcohol.
Tension band ass'y					○	
Reel drive unit					○	
Reel idler	□	□	□	□	□	
Pulley (B)	□	□	□	□	□	
Universal brake lever				○		
Supply/Take-up brake levers					○	

○ ... Replace □ ... Clean △ ... Oil

MECHANISM CHASSIS PARTS DIAGRAM



CASSETTE HOUSING CONTROL PARTS DIAGRAM



REMOVAL AND REASSEMBLY OF CASSETTE HOUSING CONTROL ASSEMBLY

Notes:

1. During removal and reassembly of the cassette housing, take care not to hit the nearby guide pins and the drum.
2. Do not forget to remove the AC power supply plug from the wall outlet at removal and reassembly.

Removal

1. Press the cassette eject button, and remove the cassette from the housing.
2. Pull off the connector on the right side of the cassette housing.
   Note:
   Be careful not to break the leads of the connector.
3. Remove two screws fixing the cassette housing.
4. Shift the cassette housing toward the arrow ⇨ B direction shown in Fig. 1-8 and take it out upwards.

Reassembly

1. Connect the connector on the right side of the cassette housing.
2. Insert the hooks of the cassette housing into main chassis, shift it toward the arrow ⇨ A, and fix it temporarily. Check if the cassette housing is placed in the right position and fix it with two screws (XHPS330P06WS0).
3. Arrange the leads of the connector properly on the right side of the cassette housing.

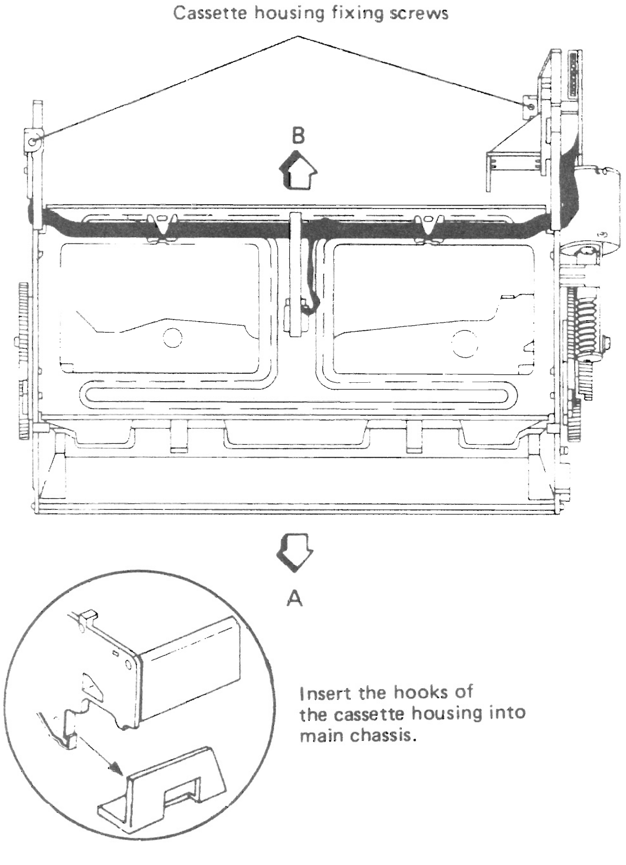

Cassette housing fixing screws
B
A
Insert the hooks of the cassette housing into main chassis.

Figure 1-8.

WHEN RUNNING A TAPE WITHOUT CASSETTE HOUSING

1. Open the cover of a cassette tape by hand and hold it open with a piece of vinyl tape.
2. Set the cassette tape in the tape mechanism. Then stabilize the cassette tape with a weight (500g or less).
   Note:
   The weight should not be more than 500g.

REPLACEMENT AND HEIGHT ADJUSTMENT OF REEL DISKS

Removal of supply reel disk

1. Remove the tension band ⑦, and tension arm ⑧.
2. Remove the slit washer ①.
3. Remove the clearance adjusting washer ②.
4. Lift the supply reel disk ③ upwards to remove, and replace.

Removal of take-up reel disk

1. Remove the slit washer ①.
2. Remove the clearance adjusting washer ②.
3. Lift the take-up reel disk ④ upwards to remove, and replace.

Notes:

1. After replacing either of the reel disks, be sure to perform it's height adjustment.
2. Take care not to damage to the tension band ⑦.
3. Be careful not to deform the auxiliary brake lever, supply brake lever, take-up brake lever and universal brake lever.
4. Check the tension pole position (see Fig. 1-15).

* At the time, remove the height adjusting washer ⑤ and clean it.

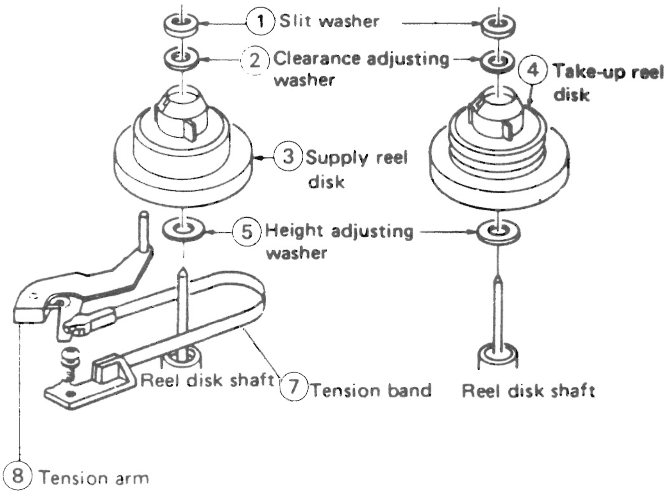


Figure 1-9.

Reassembly of supply reel disk

1. Clean the reel disk shaft and fit the height adjusting washer ⑤ .
2. Place the new supply reel disk onto the shaft.
3. Adjust the reel disk height by using the master plane and the reel height adjusting jig.
4. Take the new supply reel disk off, apply oil to the reel disk shaft and again place the disk onto the shaft.
5. Fit the clearance adjusting washer ② .

   Note:

   The reel disk thrust play should be 0.1 to 0.5mm.
6. Fit the slit washer ① .
7. Fit the tension band ⑦ , and tension arm ⑧ .

Reassembly of take-up reel disk

1. Clean the reel disk shaft and fit the height adjusting washer ⑤ .
2. Place the new take-up reel disk ④ onto the shaft.
3. Adjust the reel disk height by using the master plane and the reel height adjusting jig.
4. Take the new take-up reel disk off, apply oil to the reel disk shaft and again place the disk onto the shaft.
5. Fit the clearance adjusting washer ② .

   Note:

   The reel disk thrust play should be 0.1 to 0.5mm.
6. Fit the slit washer ① .

Notes:

1. Take care not to scratch the reel disk or shaft with a slit washer or a tool at removal and reassembly.
2. After reassembly of the take-up reel disk, check the back tension in the video search mode and also the brake torque. (See the instructions on pages 17 and 19).

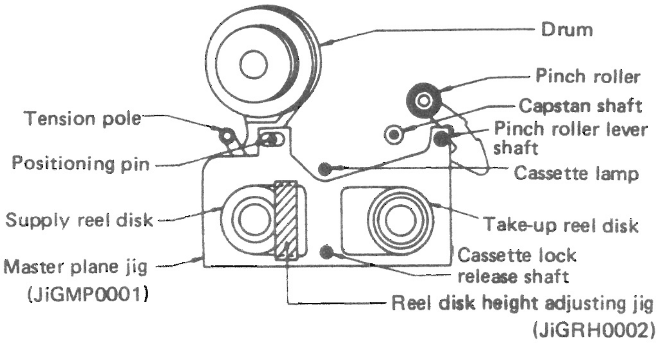
HEIGHT CHECKING AND ADJUSTMENT OF REEL DISK

1. Remove the cassette housing and set the master plane in the mechanism as shown in Fig. 1-10 (a), taking care not to hit the drum.
2. Insure that the reel disk is lower than the part "Ⓐ" but higher than part "Ⓑ" of Fig. 1-10 (b), by using the reel disk height adjusting jig.

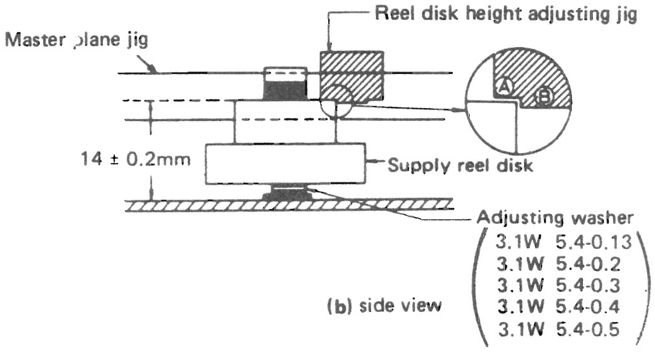
   If the height is not correct use the height adjusting washers: looseness in backlash on the shaft should not exceed 0.1 to 0.5mm.

   Note:

   Whenever replacing the reel disk, perform the height adjustment.



(a) top view



(b) side view

Figure 1-10.

CHECKING AND ADJUSTMENT OF TAKE-UP TORQUE IN FAST-FORWARD MODE

Notes:

1. When setting the torque gauge on the reel disk and pressing the fast-forward button to start the reel disk turning, take care that the torque gauge does not fly off.
2. The checking and adjustment should be carried out without a video cassette tape in place.

Checking

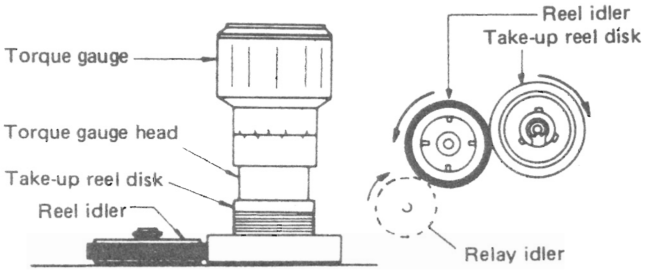
1. Remove the cassette housing.
2. Set the torque gauge on the take-up reel disk and press the fast-forward button to get the unit in the fast-forward mode.
3. Turn the torque gauge slowly (one rotation every 2 to 3 seconds) by hand in the take-up direction until it indicates 600g.cm or more.

   Check that there is no slippage between the reel idler, and relay idler or take-up reel disk.

Adjustment

If the take-up torque is outside the specified value, clean the relay idler, reel idler and take-up reel disk with cleaning fluid, and recheck the torque.

If the take-up torque is still out of specification, replace the reel belt.



(a) side view (b) top view

Figure 1-11.

CHECKING AND ADJUSTMENT OF TAKE-UP TORQUE IN REWIND MODE

Notes:

1. When setting the torque gauge on the reel disk and pressing the rewind-button to start the reel disk turning, take care that the torque gauge does not fly off.
2. When checking the take-up torque, do not keep the reel disk in a lock condition for a longer time.

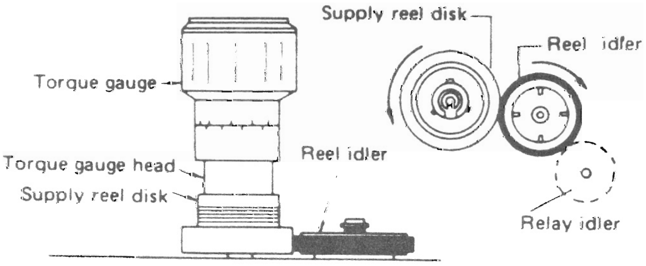
Checking

1. Remove the cassette housing.
2. Set the torque gauge on the supply reel disk and press the rewind button to get the unit in the rewind mode.,
3. Turn the torque gauge slowly (one rotation every 2 to 3 seconds) by hand in the take-up direction until it indicates 600g.cm or more. Check that there is no slippage between the reel idler and relay idler or supply reel disk.

Adjustment

If the take-up torque is outside the specified value, clean the relay idler, reel ilder and supply reel disk with cleaning fluid, then recheck the torque.

If the take-up torque is still out of specification, replace the reel belt.



(a) side view (b) top view

Figure 1-12.

CHECKING OF TAKE-UP TORQUE IN PLAY BACK MODE

Checking

Load a torque cassette meter (JiGVHT-063) into the unit and press the record button to get the unit in the record mode. (It is necessary to input the external signal). Then check that the torque is at the specified values;

standard torque: 85 ~ 135g.cm

Note:

The measured torque varies slightly with the rotation deviation of the reel drive unit. The control value within the variation shall be the observed value.

Adjustment

1. If the take-up torque in playback mode is outside the specified value, clean the reel idler, take-up reel disk and relay idler with cleaning fluid, then recheck the torque.
2. Press the record button to get the unit in the record mode, and check that the take-up torque is within the specified value.
3. Even after step 1 above, if the take-up torque in playback mode is still out of specification, replace the reel drive unit.

CHECKING OF BACK TENSION IN FAST-FORWARD MODE

Note:

Set the torque gauge securely on the reel disk; otherwise the torque gauge will be loose above the reel disk causing an inaccurate measurement.

Checking

1. Remove the cassette housing.
2. Press the fast-forward button to get the unit in the fast-forward mode.
3. Set the torque gauge on the supply reel disk, turn it clockwise slowly (one rotation every 2 to 3 seconds) and check that the torque is within 37 ± 5g.cm.

CHECKING OF BACK TENSION IN REWIND MODE

Note:

Set the torque gauge securely on the reel disk: otherwise the torque gauge will be loose above the reel disk causing an inaccurate measurement.

Checking

1. Remove the cassette housing.
2. Press the rewind button to get the unit in the rewind mode.
3. Set the torque gauge on the take-up reel disk, turn it counterclockwise slowly (one rotation every 2 to 3 seconds) and check that the torque is within 25 ± 5g.cm.

CHECKING OF BACK TENSION IN VIDEO SEARCH REWIND MODE

Note:

Set the torque gauge securely on the reel disk; otherwise the torque gauge will be loose above the reel disk causing an inaccurate measurement.

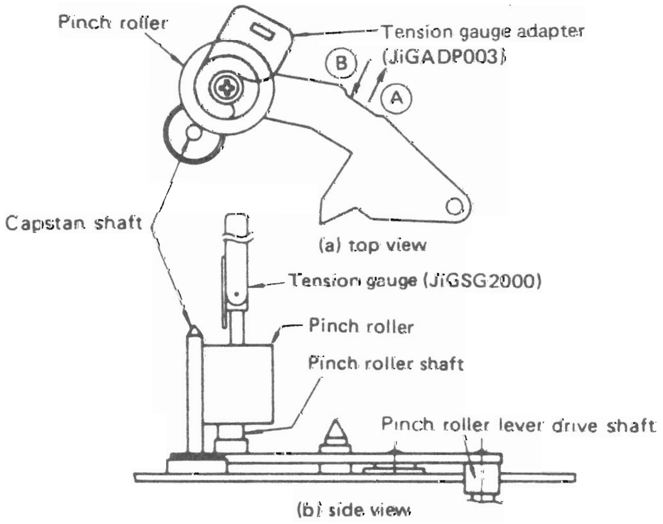
Checking

1. Remove the cassette housing.
2. Press the play button to get the unit in the playback mode.
3. Press the video search rewind button to get the unit in the video search rewind mode.
4. Set the torque gauge on the take-up reel disk, slowly turn it counterclockwise (one rotation every 2 to 3 seconds) and check that the torque is within 40 ± 8g.cm.

CHECKING OF PINCH ROLLER ENGAGEMENT FORCE

Checking

1. Remove the cassette housing.
2. Press the play button to get the unit in the playback mode.
3. Using a tension gauge adapter, pull the pinch roller in the direction of arrow ➡ Ⓐ (opposite to the pinch roller engagement) to that the pinch roller moves away from the capstan shaft.
4. Gradually return the pinch roller in the direction of arrow ➡ Ⓑ to allow it to touch the capstan shaft. When the pinch roller just touches the capstan shaft, read the indication on the gauge (JiGSG 2000).
   For the measurement, pull the tension gauge which is to be fixed on the capstan shaft by means of the tension gauge adapter (JiGADP003).
5. Check that the reading on the gauge is in the specified range of 1000 to 1200g.


Pinch roller
Tension gauge adapter (JiGADP003)
Ⓑ
Ⓐ
Capstan shaft
Tension gauge (JiGSG2000)
Pinch roller
Pinch roller shaft
Pinch roller lever drive shaft

(a) top view

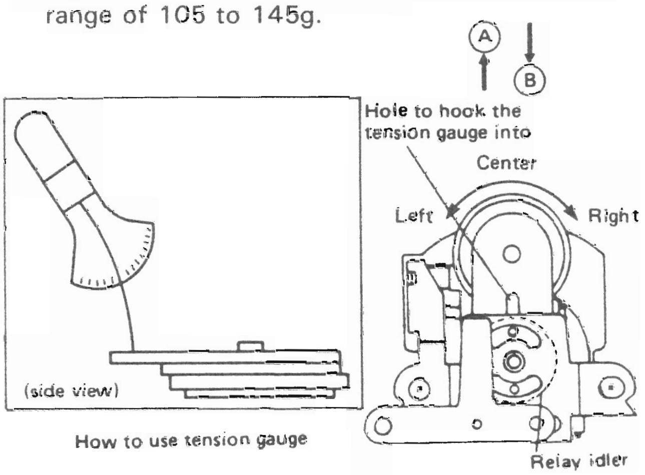
(b) side view

Figure 1-13.

CHECKING OF REEL IDLER PRESSURE

Checking

1. Remove the cassette housing.
2. Move the reel idler to its center position as shown in Fig. 1-14.
3. Using a tension gauge, press the reel idler in the direction of arrow ➡ Ⓐ in Fig. 1-14, so that the reel idler moves away from the relay idler.
4. Release the force gradually in the direction of arrow ➡ Ⓑ in Fig. 1-14, so that the reel idler touches the relay idler again. Check that the reading on the tension gauge is within the specified range of 105 to 145g.



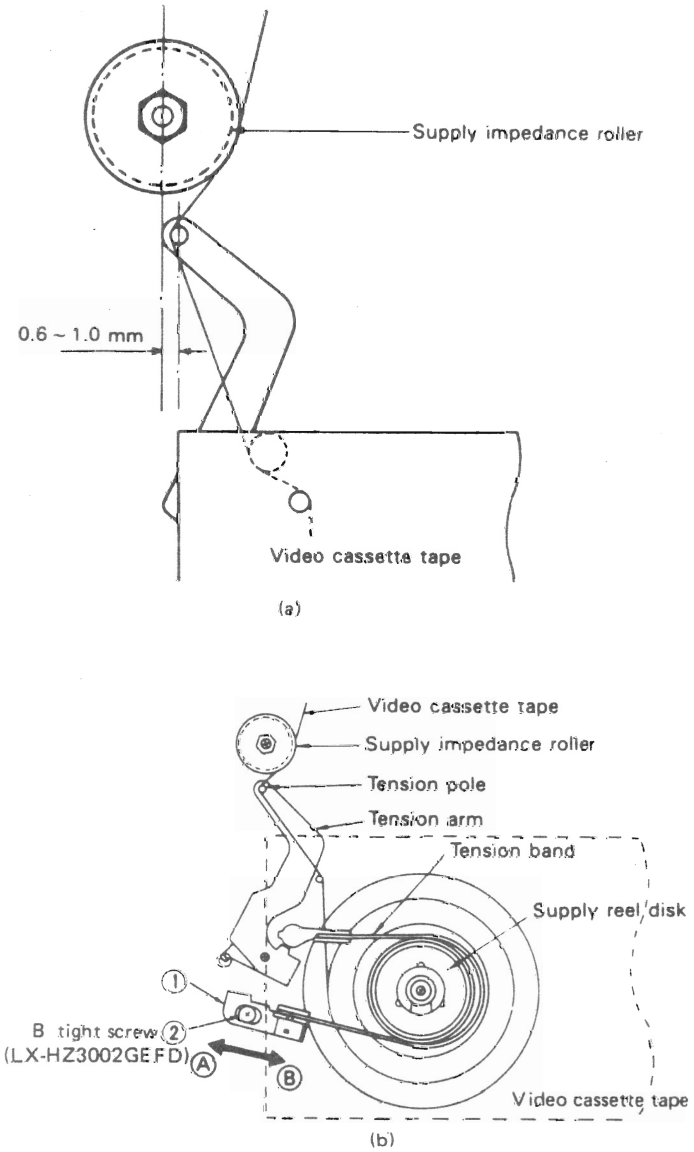
How to use tension gauge

Figure 1-14.

CHECKING AND ADJUSTMENT OF TENSION POLE POSITION

Checking

1. Remove the cassette housing.
2. Load a video cassette tape and press the record button to get the unit in the record mode.
3. The pole bases A and B (see page 7) operate to draw the tape out of the cassette housing and simultaneously the tension pole moves to the left, loading the tape. Check the position of the tension pole after the tape loading has finished.
4. At the end of a tape (E-180), visually check that the tension pole's center is 0.6 to 1.0mm to the right of the supply impedance roller's center.
5. Check that the tape is neither curled against the flange of the supply impedance roller nor mounted over it.
6. During the video search rewind mode, check that the reel disk is free of the tension band.



(b)

Figure 1-15.

Positioning adjustment

1. If the tension pole is less than 0.6mm to the right of the supply impedance roller's center, shift the tension band control angle ① in the direction of arrow ➡ Ⓐ in Fig. 1-15(b), and tighten the screw ② .
2. If the tension pole is more than 1.0mm to the right of the supply impedance roller's center, shift the tension band control angle ① in the direction of arrow ➡ Ⓑ in Fig. 1-15(b), and tighten the screw ②.

   Note:

   If the screw is tightened with more than the specified torque (5 kg), the screw hole will be crushed as it is made of resin.

   To avoid this, be sure to use the supplied torque driver (JiGTD1200).

CHECKING AND ADJUSTMENT OF BACK TENSION IN RECORD AND PLAYBACK MODES

Checking of back tension using a torque cassette meter (JiGVHT-063)

1. Remove the cassette housing.
2. Load the torque cassette into the unit.
3. Press the record button to get the unit in the record mode.
4. Check that the reading of the torque cassette's pointer is within 50 to 58g.cm.
5. Check that the video tape is wound round the retaining guide.
6. Check that the tape is not slack or damaged at either of its begining and end points.

Adjustment

1. If the reading is below 50g.cm, shift the tension adjusting lever ① in the direction of arrow ➡ Ⓐ in Fig. 1-16, and tighten the screw ②.
2. If the reading is over 58g.cm, shift the tension adjusting lever ① in the direction of arrow ➡ Ⓑ in Fig. 1-16, and tighten the screw ②.

Note:

Do not overtighten the screws as this may damage the screw threads on the chassis. To avoid this, properly handle the tension band and plate adjusting driver (JiGDRiVER-6).

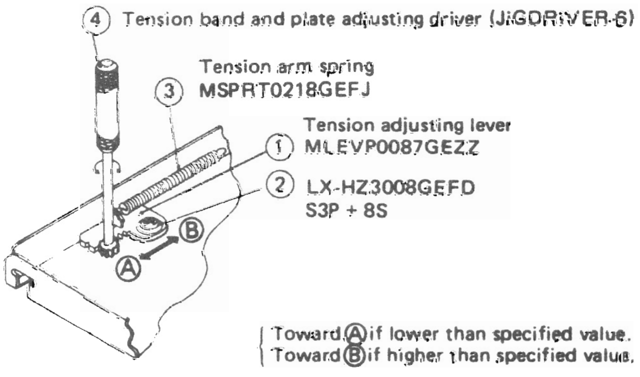

④ Tension band and plate adjusting driver (JiGDRiVER-6)
③ Tension arm spring MSPRT0218GEFJ
① Tension adjusting lever MLEVP0087GEZZ
② LX-HZ3008GEFD S3P + 8S
Ⓐ
Ⓑ
Toward Ⓐ if lower than specified value.
Toward Ⓑ if higher than specified value.

Figure 1-16.

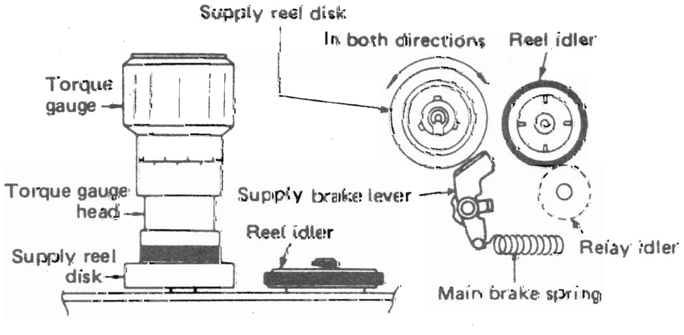
CHECKING OF THE BRAKE TORQUE

Checking of the brake torque at supply side

1. Remove the cassette housing.
2. Check that the unit is in the stop mode.
3. Separate the reel idler from the supply reel disk, and set the torque gauge on the supply reel disk.
4. Slowly rotate the torque gauge in both directions so that both the reel disk and torque gauge's pointer will move at the same speed: see that the reading is then within 280 to 720g.cm (at the brake engaging direction) or within 110 to 230g.cm (at the brake disengaging direction). And check that the brake ratio is more than 2 between its engaging and disengaging directions.

Adjustment of the brake torque at supply side

1. If the brake torque at supply side is outside the specified value (280 to 720g.cm in the engaging direction or 110 to 230g.cm in the disengaging direction), clean the supply reel disk and brake lever felt with cleaning fluid, then recheck the torque.
2. If the brake torque at supply side is still out of specification, replace the main brake spring.



(a) side view (b) top view

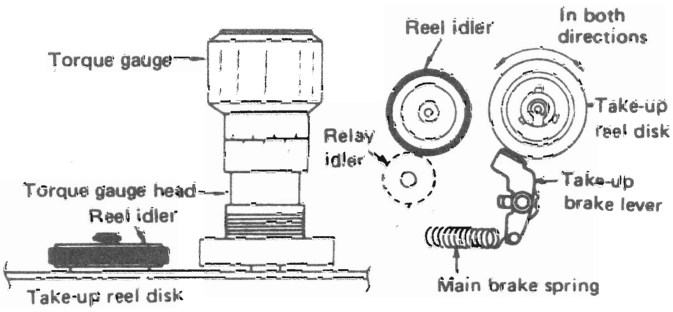
Figure 1-17.

Checking of the brake torque at take-up side

1. Remove the cassette housing.
2. Check that the unit is in the stop mode.
3. Separate the reel idler from the take-up reel disk, and set the torque gauge on the take-up reel disk.
4. Slowly rotate the torque gauge in both directions so that both the reel disk and torque gauge's pointer will move at the same speed: see that the reading is then within 280 to 720g.cm (at the brake engaging direction) or within 110 to 230g.cm (at the brake disengaging direction). And check that the brake ratio is more than 2 between its engaging and disengaging directions.

Adjustment of the brake torque at take-up side

1. If the brake torque at take-up side is outside the specified value (280 to 720g.cm in the engaging direction or 110 to 230g.cm in the disengaging direction), clean the take-up reel disk and brake lever felt with cleaning fluid, then recheck the torque.
2. If the torque at take-up side is still not within the specified value, replacement the main brake spring.



(a) side view (b) top view

Figure 1-18.

TILT CHECKING AND ADJUSTMENT OF AUDIO/CONTROL HEAD

Adjustment

1. Put the unit in the unloading mode.
   Set the audio/control head tilt adjusting jig on the main chassis as shown in Fig. 1-19 . For details, also see Fig. 1-19. Using a philips screwdriver, slowly turn the adjusting screw until there is no clearance between the jig and audio/control head. (See Fig. 1-20)

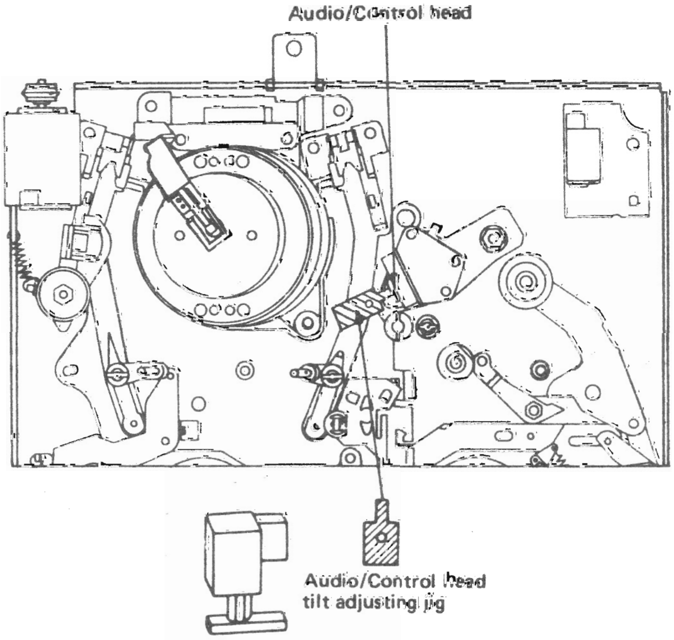


Figure 1-19.

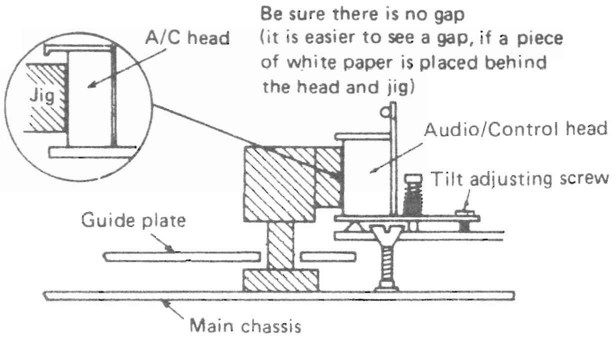


Figure 1-20.

REPLACEMENT OF AUDIO/CONTROL HEAD

Note:

After replacement, check for smooth tape movement. Under all circumstances avoid touching the head surface (indicated by " ➡ " in Fig. 1-22.).

Replacement

1. Remove the leads from the audio/control head PWB.
2. Undo the tilt adjusting screw ⑥ with a philips screwdriver.
3. Remove the screw ⑤ (3P+8S) with a philips screwdriver.
4. Undo the audio/control head screw ④ with a philips screwdriver: pay attention to the spring between the guide plate and the audio/control head screw.
5. Unsolder the connector attached to the audio/control head PWB, and resolder this connector to the new audio/control head PWB. Then replace the audio/control head assembly with a new one.
6. Install the new audio/control head assembly so that the audio/control head plate is almost in parallel with the guide plate.
7. Adjust the audio/control head tilt angle as shown Fig. 1-20.
8. Use a rough alignment tape and play it back. Using the specified box driver, turn the hexagon nut for audio/control head height adjustment so that the audio/control head has the height with regard to the tape as shown in Fig. 1-21.

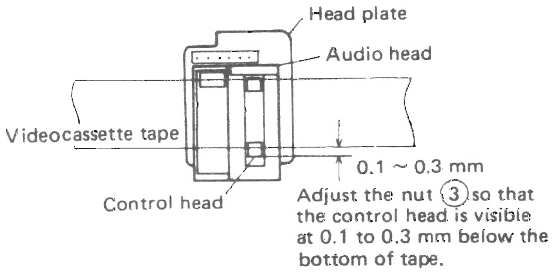

Head plate
Audio head
Videocassette tape
Control head
0.1 ~ 0.3 mm
Adjust the nut ③ so that the control head is visible at 0.1 to 0.3 mm below the bottom of tape.

Figure 1-21.

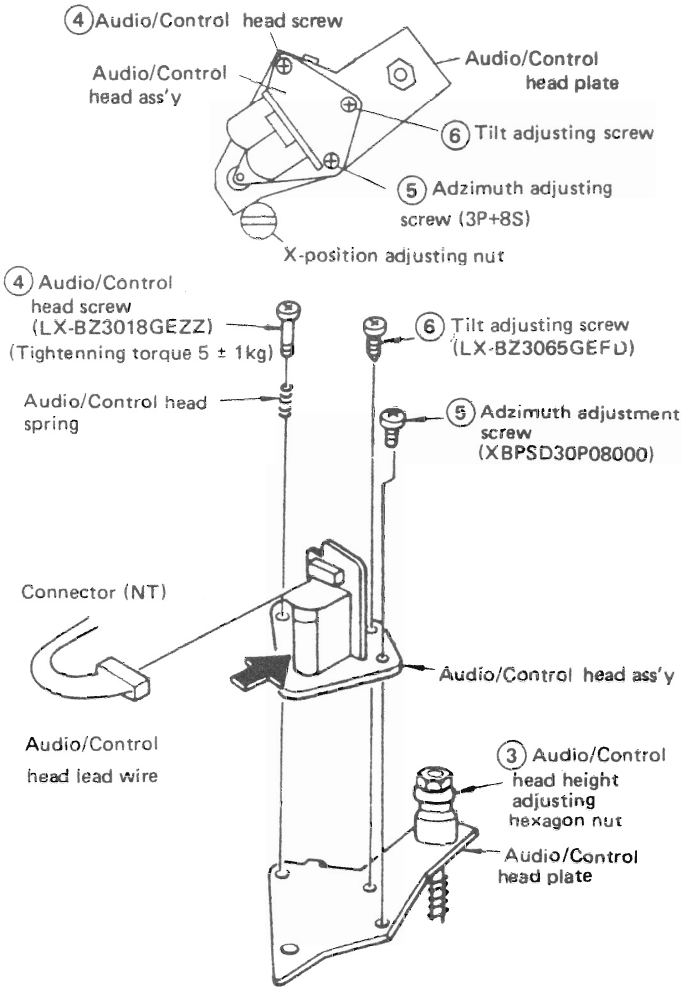

④ Audio/Control head screw
Audio/Control head ass'y
Audio/Control head plate
⑥ Tilt adjusting screw
⑤ Adzimuth adjusting screw (3P+8S)
X-position adjusting nut
④ Audio/Control head screw (LX-BZ3018GEZZ) (Tightenning torque 5 ± 1kg)
⑥ Tilt adjusting screw (LX-BZ3065GEFD)
Audio/Control head spring
⑤ Adzimuth adjustment screw (XBPSD30P08000)
Connector (NT)
Audio/Control head ass'y
Audio/Control head lead wire
③ Audio/Control head height adjusting hexagon nut
Audio/Control head plate

Figure 1-22.

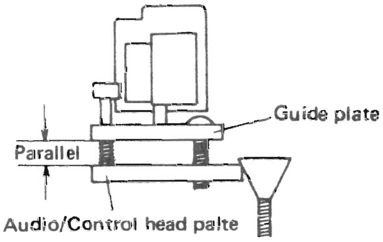


Figure 1-23.

VR6843/56

ADJUSTMENT OF TAPE TRAVEL

1. Check and adjust the position of the tension pole. And check and adjust back tension (See page 18).
2. Set the tilt angle of the audio/control head as shown in Fig. 1-20.
   Note:
   If the audio/control head is adjusted, check and set the tilt angle as in the case of replacement.
3. After completing setting, execute preliminary adjustment of tape travel.
   a. Connect an oscilloscope to TP703 (playback chrominance) and TP704 (ground). Allow the playback chrominance signal to be triggered by the head switching pulse of TP701
   b. Loosen the setscrew of the guide roller, and tighten it loosely by using a guide roller adjusting screwdriver (JiGDRiVERH-4) to such an extent so that the guide roller turns smoothly.
   c. Set an alignment tape (VRōCPSV) on the reel disk.
   Note:
   When setting the cassette tape on the reel disk without cassette housing, fix the cassette tape with weight of 400 to 650g.
   d. Set playback mode.
   e. Observe the playback chrominance envelope waveform and check flatness of the playback chrominance envelope, turning the tracking control clockwise and counterclockwise.
   If playback chrominance output changes almost flat when the tracking control is turned clockwise and counterclockwise, it is good. If the flatness is poor, adjust the guide roller so that playback chrominance output becomes nearly flat.
   Adjust the X-position adjusting nut so that the playback chrominance envelope becomes almost maximum in the tracking center. In the case of rough adjustment, pay particular attention to the outlet side (See Fig. 1-25).

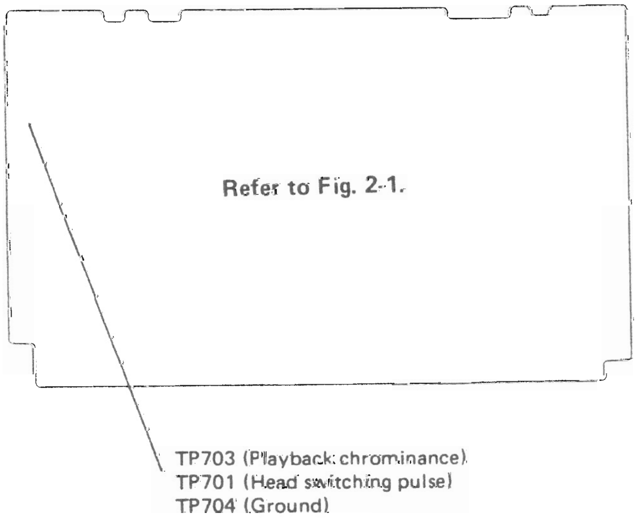


Figure 1-24.

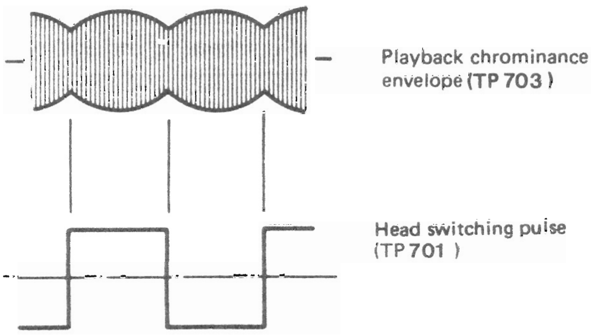

Playback chrominance envelope (TP 703)
Head switching pulse (TP 701)

Figure 1-25.

4. When rough adjustment of the tape travel is finished, adjust the audio/control head's height and azimuth.
   a. Play an alignment of the tape, audio 6 kHz (picture is monoscope), and observe the audio output on an oscilloscope from the audio output terminal.
   b. Adjust the azimuth adjusting screw ⑤ (3P + 8S) to obtain the maximum audio output level.
   c. Slowly rotate the audio/control head's height adjusting hexagon nut ③ by the specified box driver (JiGDRiVER110-7) to obtain the maximum audio output level.
   d. After the height adjustment, play the alignment tape, audio 6 kHz monoscope, and perform adjustment stated in 4-b. above. After adjustment, apply screwlock to the setscrews and nuts to fix.
5. After the audio/control head adjustment, proceed to final tape travel adjustment and X-position adjustment.
   a. Connect as stated in 3-a.
   b. Play an alignment tape (VRōCPSV).
   c. Observing the envelope on the oscilloscope, finely adjust the guide roller height.
   Rotate the tracking control clockwise and counterclockwise to adjust the guide roller so as to attain the best flatness of envelope. If the video tape deviates up or down the helical lead, the playback chrominance envelope waveform is as shown in Fig. 1-26. Attain the best flatness of envelope, following the procedure shown in Fig. 1-26.

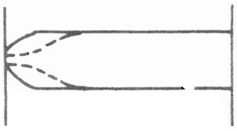
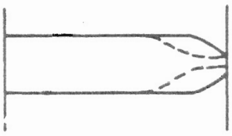
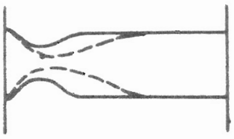
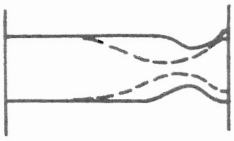
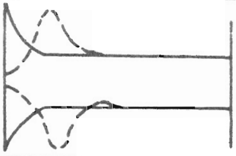
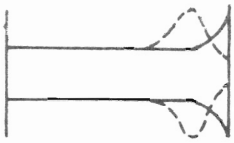
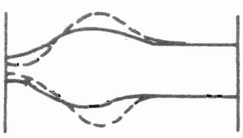
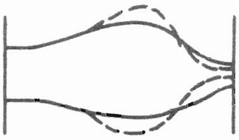
	When the tape is loose above the helical lead position.		When the tape is close to the helical lead position.	
	Drum inlet	Drum outlet	Drum inlet	Drum outlet
When the tracking control is turned clockwise				
When the tracking control is turned counterclockwise				
Adjustment procedures	Lower the guide roller (at the drum inlet) by turning it clockwise to make flat the envelope.	Lower the guide roller (at the drum outlet) by turning it clockwise to make flat the envelope.	First raise the guide roller (at the drum inlet) by turning it counterclockwise to have the tape float above the helical lead position, then turn the guide roller clockwise to make flat the envelope.	First raise the guide roller (at the drum outlet) by turning it counterclockwise to have the tape float above the helical lead position, then turn the guide roller clockwise to make flat the envelope.

Figure 1-26.

Notes:

The above adjustment is made at the switching pulse high channel side (See Fig. 1-25).

The broken lines represent the envelope waveform when up-down deviation is maximum.

After adjustment, finally tighten the setscrew of the guide roller.

Again play an alignment tape (VR5CPSV) (in unloading mode), and check that the envelope of playback chrominance envelope signal is normal.

d. After tape travel adjustment, adjust the X-position. Set the playback mode tracking control to the preset position, rotate the X-position adjusting nut shown in Fig. 1-27 with the X-position adjusting screwdriver so as to obtain the maximum envelope of switching pulse (High channel), and adjust the positions of the audio/control head. After the X-position adjustment, adjust the switching point to 6.5±0.5H. Check the flatness of envelope and sound by self-recording.

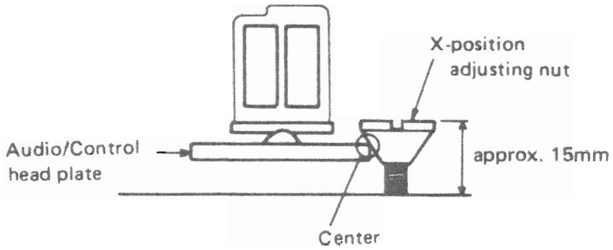


Figure 1-27.

REPLACEMENT OF UPPER DRUM

Note:

The engagement between the disk (outer diameter) and the upper drum (inner diameter) is very accurate in the order of microns, and due care should be paid to their replacement. Even a slight entry of foreign matter will affect the accuracy of their reassembly.

Replacement

1. Unsolder the leads ① to ④ and remove them.
2. Remove two screws ⑤ [brass screws (W3P+9S) with plain washer] by using a philips screwdriver.
3. Withdraw the upper drum with care not to allow it to be tilted, and replace it. Do not damage the outer surface of the disk. For withdrawal of the upper drum, use the jig (specialized for removing the upper drum) shown in Fig. 1-29.

   Notes:

   1. Avoid touching the drum surface with bare hands.
   2. Do not hit on the screws, when driving them in.

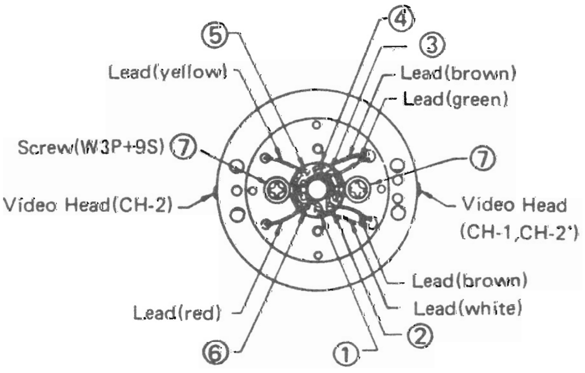


Figure 1-28.

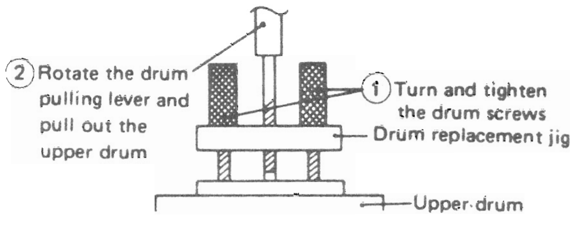

② Rotate the drum pulling lever and pull out the upper drum
① Turn and tighten the drum screws
Drum replacement jig
Upper drum

Figure 1-29.

Reassembly

1. Set in place the new upper drum as shown in Fig. 1-28, and arrange the leads to be at their specified positions.

   Notes:

   1. Before replacement the upper drum, check that there are no scratches or dust on the edge or the outer surface of the disk.
   2. Before replacing, the upper drum, check that there are no scratches or dust on the edge or the inner surface of the upper drum.
   3. On assembling these parts, slowly insert the upper drum into the disk with the utmost care, so that the upper drum will not be tilted.
   4. When assembling these parts, do not allow foreign matter to come between them.
   5. Do not use excessive force when driving in the screws.
2. Fasten the upper drum with two screws ⑤ .
3. Solder the leads ① to ④ at their respective positions.

   Note:

   Soldering should be performed quickly and carefully without touching the adjoining patterns.
4. After the replacement, be sure to check the tape travel and the followings.
   a. Adjustment of the playback switching point
   b. Checking and adjustment of the X-position

REPLACEMENT OF THE MECHANISM CONTROL UNIT

Removal

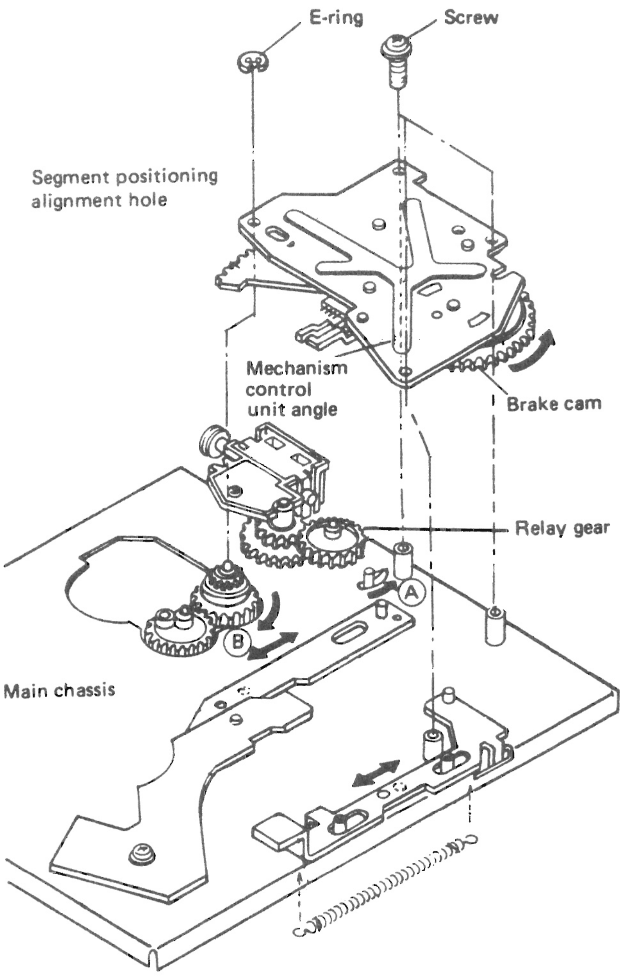
1. Remove the cam switch leads from the reel sensor PWB.
2. Remove the E-ring.
3. Remove three B-tight screws.
4. Holding up the mechanism control unit angle, detach it from the main chassis.

Reassembly

1. Remove the slit washer and relay gear B.
2. Align the shifter A and brake drive lever with each other.
   (There is an alignment hole on the main chassis, and each of the shifter A and brake drive lever is also given an alignment hole. Use these holes for alignment of the parts; to facilitate this, remove the main brake spring.)
3. Remove the tension arm spring, and rotate the ding gear A and loading gear B fully in the arrow direction to get the unit in the unloading mode.
4. Remove the full erase head arm spring and move the arm in the indirection of arrow ➡ Ⓐ .
5. Rotate the brake cam of the mechanism control unit angle in the arrow direction, and bring the center of the alignment hole of the segment gear to that of the alignment hole of the supporting angle.
6. Attach the mechanism control unit angle to the main chassis: to facilitate this, move the shifter A rightward.
7. Secure the three B-tight screws.
8. Fit the E-ring.
9. Arrange the cam switch leads (red, black and blue) on the reel sensor PWB.
10. Fit the relay gear B and slit washer.
11. Replace the main brake spring and other springs their original positions.

tes:

1. When tightening the B-tight screw (LX-HZ3027GEFD), do not give it undue force with more than the specified torque. Or the screw threads of the boss may be crushed.
2. After the resassembly, check for proper alignment of each part and see that the mechanism is normally functioning in each mode.


E-ring
Screw
Segment positioning alignment hole
Mechanism control unit angle
Brake cam
Relay gear
Ⓐ
Ⓑ
Main chassis

Fiugre 1-30.

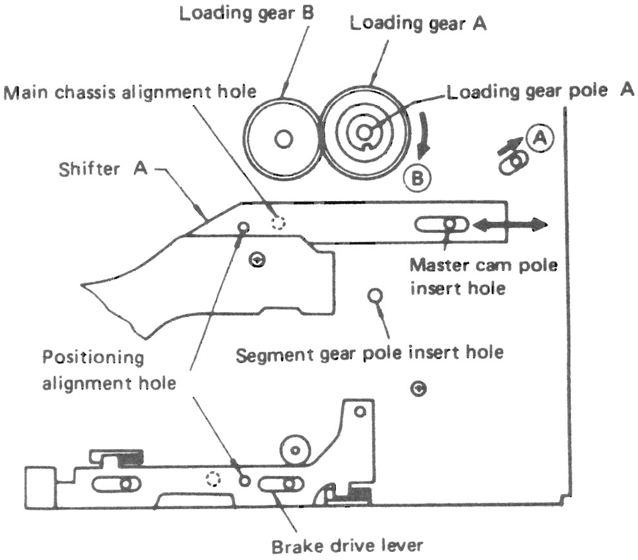

Loading gear B
Loading gear A
Main chassis alignment hole
Loading gear pole A
Ⓐ
Ⓑ
Shifter A
Master cam pole insert hole
Segment gear pole insert hole
Positioning alignment hole
Brake drive lever

Figure 1-31.

REPLACEMENT OF CAM SWITCH

Removal

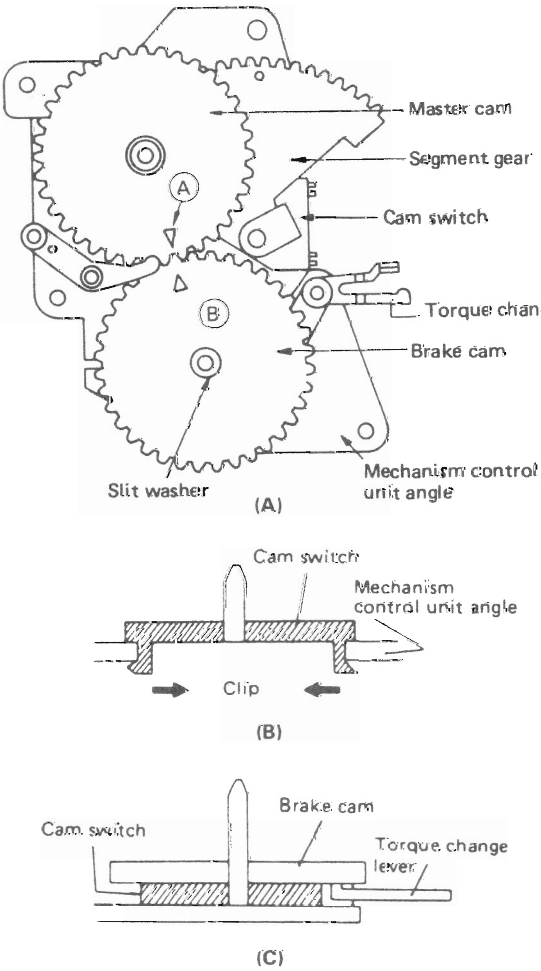
1. Remove the slit washer from the mechanism control unit angle and detach the brake cam.
2. Remove the cam switch from the mechanism control unit angle.
   Note:
   Keeping the clip of the cam switch in the arrow direction, remove the cam switch from the mechanism control unit angle.

Reassembly

1. Attach the cam switch to the brake cam.
2. Set the brake cam and cam switch assemblies on the mechanism control unit angle.
   Note:
   At the time, align the positioning mark Ⓐ of the master cam and the positioning mark Ⓑ of the brake cam with each other, and allow the torque change lever to come into the groove of the brake cam.
3. Attach the slit washer to the pole of brake cam.

Notes:

1. After the reassembly, rotate the brake cam in either direction to see that the torque change lever is in the groove of the brake cam.
2. When replacing the master cam and/or brake cam, never fail to apply grease to its groove.



(A)

(B)

(C)

Figure 1-32.

REPLACEMENT OF CAPSTAN DD (Direct Drive) MOTOR

Removal

1. Remove the card cable from the capstan DD (direct drive) motor control PWB. When removing the cable from the PWB, hold the PWB with your hand so that it won't be damaged with the shock resulting from the removal.
2. Remove the B-tight screw which secure the capstan DD motor control PWB with the main chassis.
3. Remove the cup tight screw which secure the capstan DD motor heat sink plate with the main chassis.
4. Remove three screws 2.6P + 5.5S (S. Cup)(LX-HZ3036GEFD) and detach the capstan DD motor from the main chassis.

Reassembly

1. Position the capstan DD motor on the main chassis with care not to allow the capstan shaft to hit the main chassis. Then secure the capstan DD motor and main chassis with the three screws 2.6P+5.5S(S.Cup)(LX-HZ3036GEFD).
2. Set the capstan DD motor control PWB on the main chassis, and secure them with the B-tight screw.
3. Set the capstan DD motor heat sink plate on the main chassis, and secure them with the cup tight screw.
4. Connect the card cable to the capstan DD motor control PWB.

Notes:

1. After installing the new capstan DD motor, be sure to let it run.
2. Check and adjust the servo circuit.
3. When tightening the B-tight screw, do not give it undue force with more than the specified torque. Or the screw threads of the boss may be crushed.

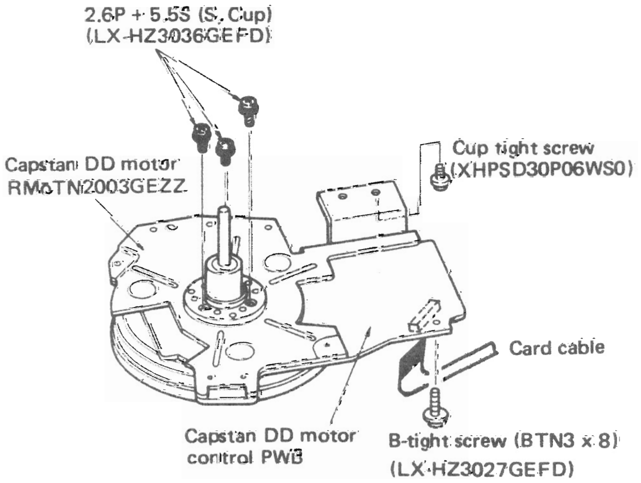


Figure 1-33.

CHECKING OF THE UNIVERSAL BRAKE LEVER

Checking

1. Remove the cassette housing.
2. Press the play button to set the unit to playback mode, and remove the power cord.
3. Remove the reel idler from the take-up reel disk, and set the torque gauge.
4. Slowly rotate the torque gauge so that the reel disk and torque gauge pointer turn with the equal speed, and check that the set value is as specified (within 30 ± 10g.cm).

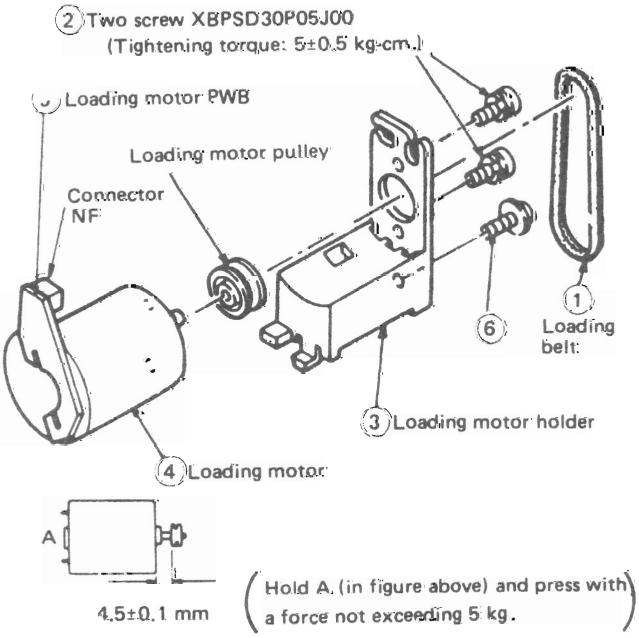
REPLACEMENT OF THE LOADING MOTOR

Replacement

1. Remove four screws (XEBSD40P16000) securing the main chassis to the bottom cabinet.
2. Disconnect the drum DD motor lead connector and the loading motor relay lead NF connector.
3. Remove the loading belt.
4 move the cup-tight screw (XHPSD30P08WS0) ⑥. Tilt the main chassis for easy removal.
5. Remove two screws (XBPSD30P05J00) ② and remove the loading motor from the loading motor holder.
6. Remove the loading motor PWB ⑤.
7. Replace the loading motor along with the pulley.

Notes:

1. Check that the space between the motor and the loading motor pulley is 4.5 ± 0.1 mm.
2. After installing the loading motor, be sure to rotate the loading motor, check for smooth movement and recheck the height checking and adjustment of reel disks and also the adjustment of tape travel (see pages 15 and 21).



(Hold A. (in figure above) and press with a force not exceeding 5 kg.)

Figure 1-34.

REPLACEMENT OF DD (Direct Drive) MOTOR

Removal

1. Remove two screws ①, using a philips screwdriver, which hold the DD rotor assembly.
2. Remove the DD rotor assembly by pulling it straight out.
3. Remove three brass screws ②, using a philips screwdriver, which hold the DD stator assembly.
4. Remove the DD stator assembly by pulling it straight out.

Assembly

1. Place the DD stator assembly on top of the lower drum.
2. Secure the DD stator with the three brass screws ② by using a philips screwdriver.

   Note:

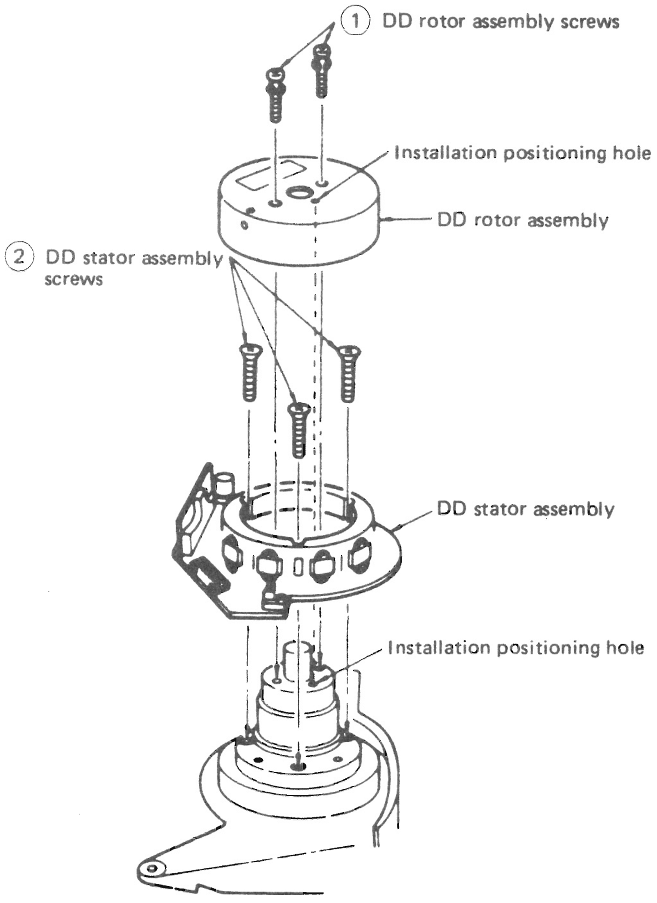
   Be careful not to scratch the core, winding or hall element.
3. Install the DD rotor assembly onto the drum shaft.

   Note:

   Press it down straightly and observe it's setting direction as shown in Fig. 1-35.
4. Secure the DD rotor assembly by the screw ①.
5. Apply screw-lock to the screws ①
6. After the replacement of DD motor adjust the playback switching point.

Notes:

1. Be careful not to damage the upper drum or the video head.
2. Do not let tools on the DD rotor assembly contact or hit the hall element.


① DD rotor assembly screws
Installation positioning hole
DD rotor assembly
② DD stator assembly screws
DD stator assembly
Installation positioning hole

Note 1: Secure the DD rotor assembly so that the installation positioning holes in the DD rotor assembly and lower drum match.

Figure 1-35.

REPLACEMENT OF THE DD BRAKE SOLENOID

1. Remove two solenoid wires from the DD motor control PWB.
2. Remove two screws ① (XHPSD26P04000) securing the DD motor control PWB.
3. Remove the DD brake lever spring ② (MSPRT0239-GEFJ).
4. Remove the slit washer ③ (LX-WZ1006GE00).
5. Raise the DD brake lever ④ (MLEVP0102GEZZ) to the direction Ⓐ.
6. Remove two screws ⑦ (XBPSD20P05J00) and two spacers ⑩ (PSPAB0019GEFW) securing the solenoid ⑤ (RPLU-0080GEZZ) and DD brake mounting plate ⑥ (LANGF9290GEZZ).
7. Remove the slit washer ⑨ (LX-WZ1001GE00) and the spring ⑧ (MSPRC0116GEFJ) from the iron core.
8. Replace the solenoid.
   Note:
   Keep the iron core close fitted to the solenoid, and check that there is a gap between the iron core and DD brake lever.

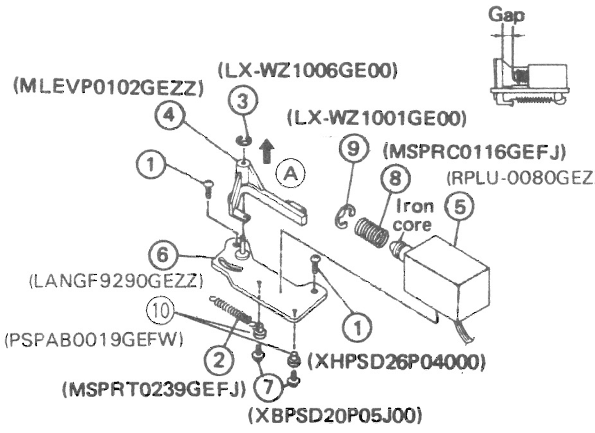


Figure 1-36.

ADJUSTMENT OF PLAYBACK SWITCHING POINT

Caution:

This mode is applicable to both PAL and NTSC system, and it is needed to prepare two alignment tapes, PAL (VRōCPSV) and NTSC (VRōATSV), for adjustment of the playback switching point.

Adjustment

1. Use a PAL alignment tape (monoscope) to play it back, then adjust R750 and or R752 (switching point control) so that the output is 6.5 ± 0.5H.
2. Use a NTSC alignment tape (monoscope) to play it back, then adjust R748 and or R754 (switching point control) so that the output is 6.5 ± 0.5H.

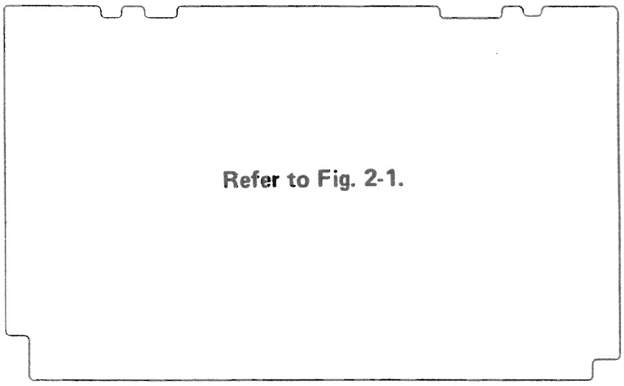


Figure 1-33.

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ADJUSTMENT OF ELECTRICAL CIRCUITS

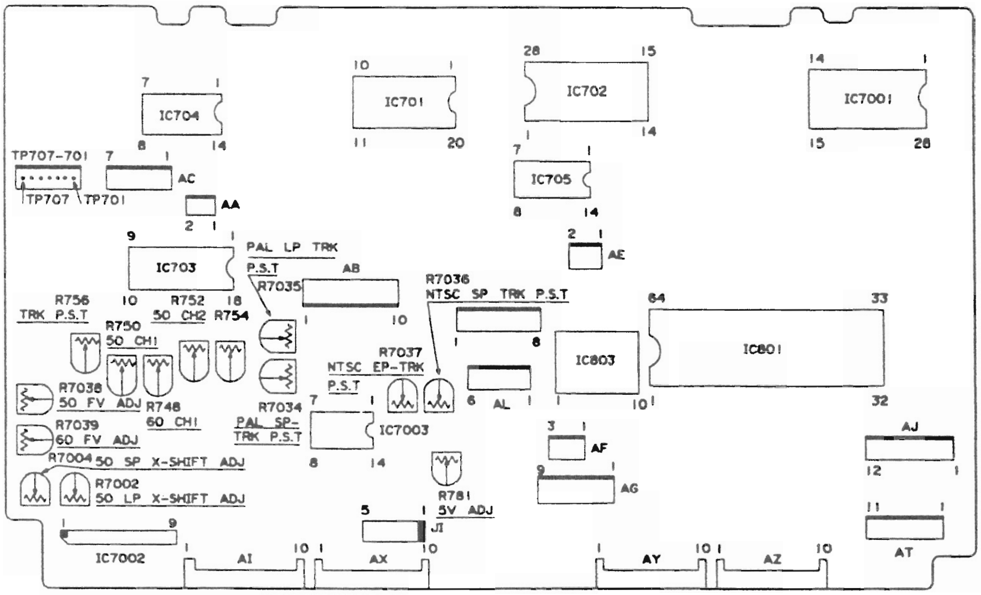
In most cases, necessity for electrical circuits will arise from replacement of mechanical parts including the video head. Before starting adjustment of electrical circuits, check that mechanical operation of the equipment is complete (the mechanism are adjusted completely).

If the equipment fails electrically, locate a defect or defects first of all using instruments. Then repair or replace parts and make adjustment by the procedures described below.
When required instruments are not available, do not move controls indiscriminately.

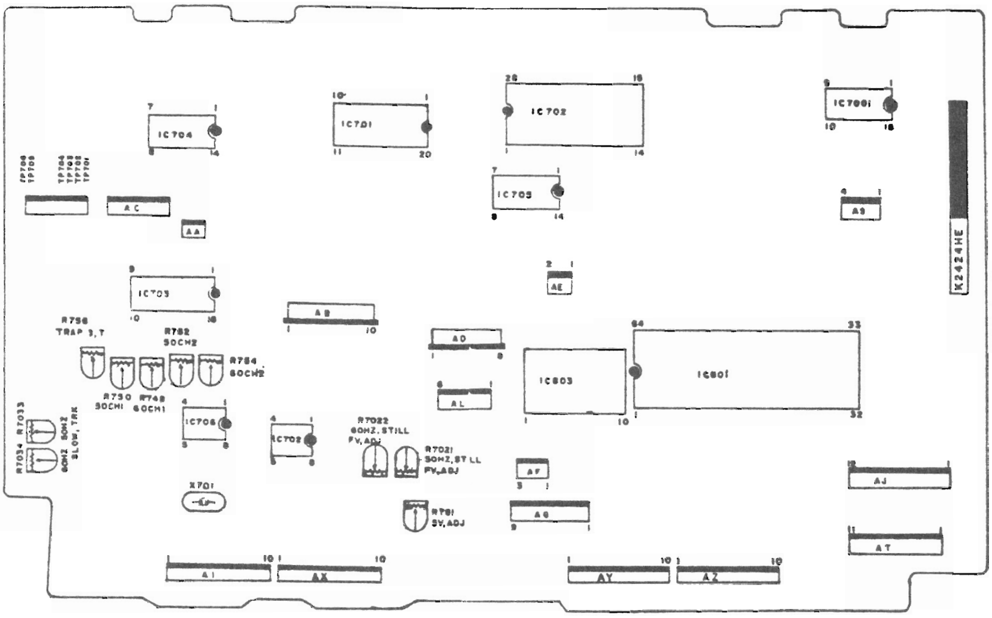
- **Instruments**
  - Colour monitor TV
  - DC regulated power supply
  - VTVM
  - Oscilloscope
  - Audio generator
  - Colour bar generator
  - Alignment tape
  - Frequency counter
  - Blank video tape (VHS)

■ ADJUSTMENT OF SERVO CIRCUIT

- **Test Points Layout of System Control, Servo PWB.**



— VR6843/56 (DUNTK2159HE) —



— VR6643/59 (DUNTK2424HE) —

Figure 2-1.

STEP 5.

Adjustment of PAL CH-1 and CH-2 phase (SP mode)

1. Put the unit in the PAL playback mode, using an alignment tape (VR5CPSV).
2. Observe the output of TP701 (head switching pulse) and video output with an oscilloscope.
3. Using the plus sync slope of oscilloscope, adjust R750 (3H SP CH-1 phase control) so that the output level is at 6.5 ± 0.5H.
4. Using the minus sync slope of oscilloscope, adjust R752 (3H SP CH-2 phase control) so that the output level is at 6.5 ± 0.5H.

STEP 6.

Adjustment of PAL CH-1/CH-2 phase relative error

1. Put the unit in the PAL playback mode, using an alignment tape (VR5CPSV).
2. Observe the output of TP701 (head switching pulse) and video output with an oscilloscope.
3. Exchange the plus sync slope and minus sync slope of oscilloscope with each other, and check that the variation at the front of the vertical sync signal is within ±0.5H.
4. If the variation of CH-1 and/or CH-2 is not out of the specified range (±0.5H), readjust the phase of CH-1 or CH-2 whichever has the larger variation.

   Note:

   If the CH-1/CH-2 phase relative error is greatly out of the specified range (±0.5H), there is a trouble that the reproduced picture fluctuates vertically in the video search mode.

STEP 7.

Adjustment of NTSC CH-1 and CH-2 phase (SP mode)

1. Put the unit in the NTSC playback mode, using an alignment tape (VR5ATSV).
2. Observe the output of TP701 (head switching pulse) and video output with an oscilloscope.
3. Using the plus sync slope of oscilloscope, adjust R748 (2H SP CH-1 phase control) so that the output level is at 6.5 ± 0.5H.
4. Using the minus sync slope of oscilloscope, adjust R754 (2H SP CH-2 phase control) so that the output level is at 6.5 ± 0.5H.

STEP 8.

Adjustment of NTSC CH-1/CH-2 phase relative error

1. Put the unit in the NTSC playback mode, using an alignment tape (VR5ATSV).
2. Observe the output of TP701 (head switching pulse) and video output with an oscilloscope.
3. Exchange the plus sync slope and minus sync slope of oscilloscope with each other, and check that the variation at the front of the vertical sync signal is within ±0.5H.
4. If the variation of CH-1 and/or CH-2 is out of the specified range (±0.5H), readjust the phase of CH-1 or CH-2 whichever has the larger variation.

   Note:

   If the CH-1/CH-2 phase relative error is greatly out of the specified range (±0.5H), there is a trouble that the reproduced picture fluctuates vertically in the video search mode.

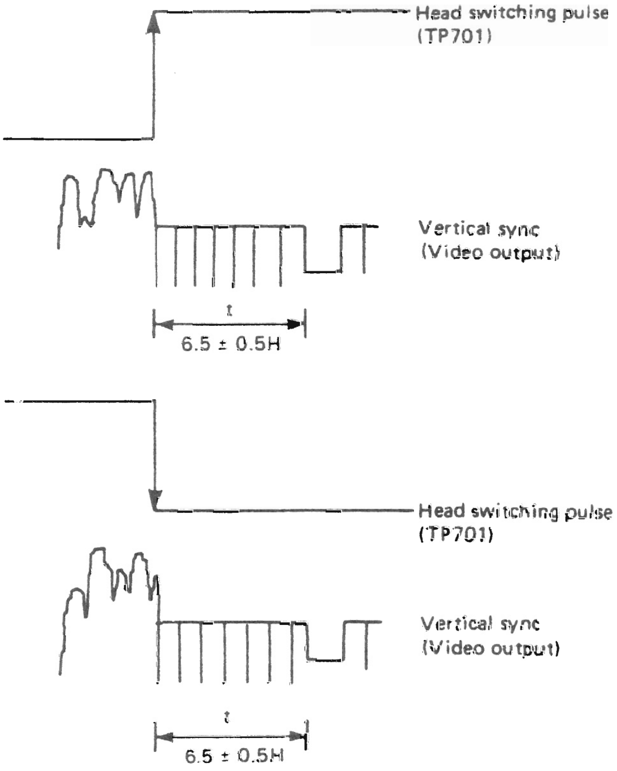


Figure 2-6.

STEP 9.

Checking of PAL recording phase (SP mode)

1. Record a PAL video signal on an E-180 tape, and play it back.
2. Observe the output of TP701 (head switching pulse) and video output with an oscilloscope.
3. Check that the output level is at 6.5 ± 2.0H.

STEP 10.

Checking of NTSC recording phase (SP mode)

1. Record a NTSC video signal on an E-180 tape, and play it back.
2. Observe the output of TP701 (head switching pulse) and video output with an oscilloscope.
3. Check that the output level is at 6.5 ± 2.0H.

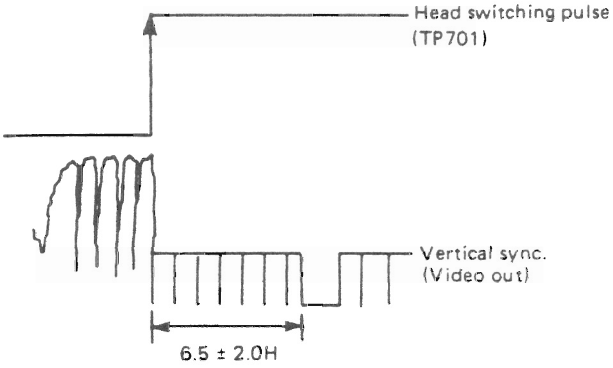


Figure 2-7.

STEP 11.

Adjustment of PAL false vertical sync in the slow/still mode.

Note:
Before this adjustment, be sure to check that the adjustment of PAL CH-1/CH-2 relative error in STEP 6 has been properly done.

1. Put the unit in the PAL playback mode, using an E-180 tape.
2. Put the unit in the PAL still mode.
3. Observe the output of TP701 (head switching pulse) and video output with an oscilloscope, and adjust R7038 for VR6843/56 (or R7021 for VR6643/59) (3H slow/still FV sync. control) so that the output level is shown in Fig. 2-8.
4. Adjust R7038 for VR6843/56 (or R7021 for VR6643/59) so that there is the least of noise on TV monitor.

STEP 12.

Checking of PAL false vertical sync in the video search mode.

1. Record a PAL video signal on an E-180 tape, and play it back.
2. Put the unit in the video search mode.
3. Check that the horizontal raster does not move up and down so noticeably on TV monitor.

STEP 13.

Adjustment of NTSC false vertical sync in the slow/still mode

Note:
Before this adjustment, be sure to check that the adjustment of NTSC CH-1/CH-2 relative error in STEP 8 has been properly done.

1. Record a NTSC video signal on an E-180 tape, and play it back.
2. Put the unit in the still mode.
3. Observe the output of TP701 (head switching pulse) and video output with an oscilloscope, and adjust R7039 for VR6843/56 (or R7022 for VR6643/59) (2H slow/still FV sync. control) so that the output level is as shown in Fig. 2-8.
4. Adjust R7039 for VR6843/56 (or R7022 for VR6643/59) so that there is the least deviation of noise on TV monitor.

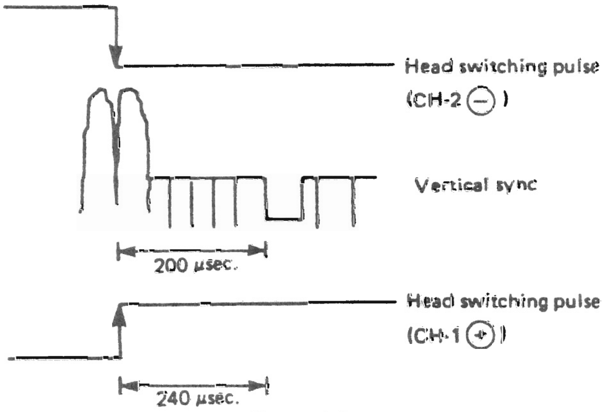


Figure 2-8.

STEP 14.

Adjustment of slow/still tracking preset (VR6843/56)

Note:

- Use of a remote control transmitter is needed to put the unit in the slow mode.
- Before this adjustment of slow/still tracking preset, be sure to check that the slow tracking control located on the front panel has been set at its center click position.

(a) PAL SP mode:

1. Placing the unit in the PAL SP mode, record a video signal and play it back, then put the unit in the slow mode with use of a remote control transmitter.
2. Adjust R7034 so that there appear no noises on the monitor screen.

(b) PAL LP mode:

1. Placing the unit in the PAL LP mode, record a video signal and play it back, then put the unit in the slow mode with use of a remote control transmitter.
2. Adjust R7035 so that there is the least deviation of noise on the monitor screen.

(c) NTSC SP mode:

1. Placing the unit in the NTSC SP mode, record a video signal and play it back, then put the unit in the slow mode with use of a remote control transmitter.
2. Adjust R7036 so that there is the least deviation of noise on the monitor screen.

(d) NTSC EP mode:

1. Placing the unit in the NTSC EP mode, record a video signal and play it back, then put the unit in the slow mode with use of a remote control transmitter.
2. Adjust R7037 so that there is the least deviation of noise on the monitor screen.

   If there appear noises on the monitor screen, adjust the control so that they move up and down first and then the picture will be stable for the viewer's preference.

■ ADJUSTMENT OF Y/C CIRCUIT

Adjustment of E-E level

Note:
The video output must be terminated with a resistor of 75 ohms.

- Put the unit in the stop mode and connect a VTVM to TP402, and adjust R464 so that the VTVM reads the power voltage of 9.5 ± 0.1V.

1. Put the unit in the PAL SP record mode, using an E-180 tape.
2. Apply a colour bar signal (stair-step waveform) to the unit. And observe the video output with an oscilloscope.
3. Adjust R229 (E-E level control) so that the level becomes 1.0 ± 0.05Vp-p.

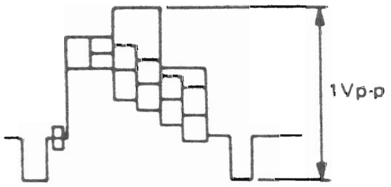


Figure 2-9.

- **Test Point Layout**

  (Y/C PWB) —DUNTK2161HE—

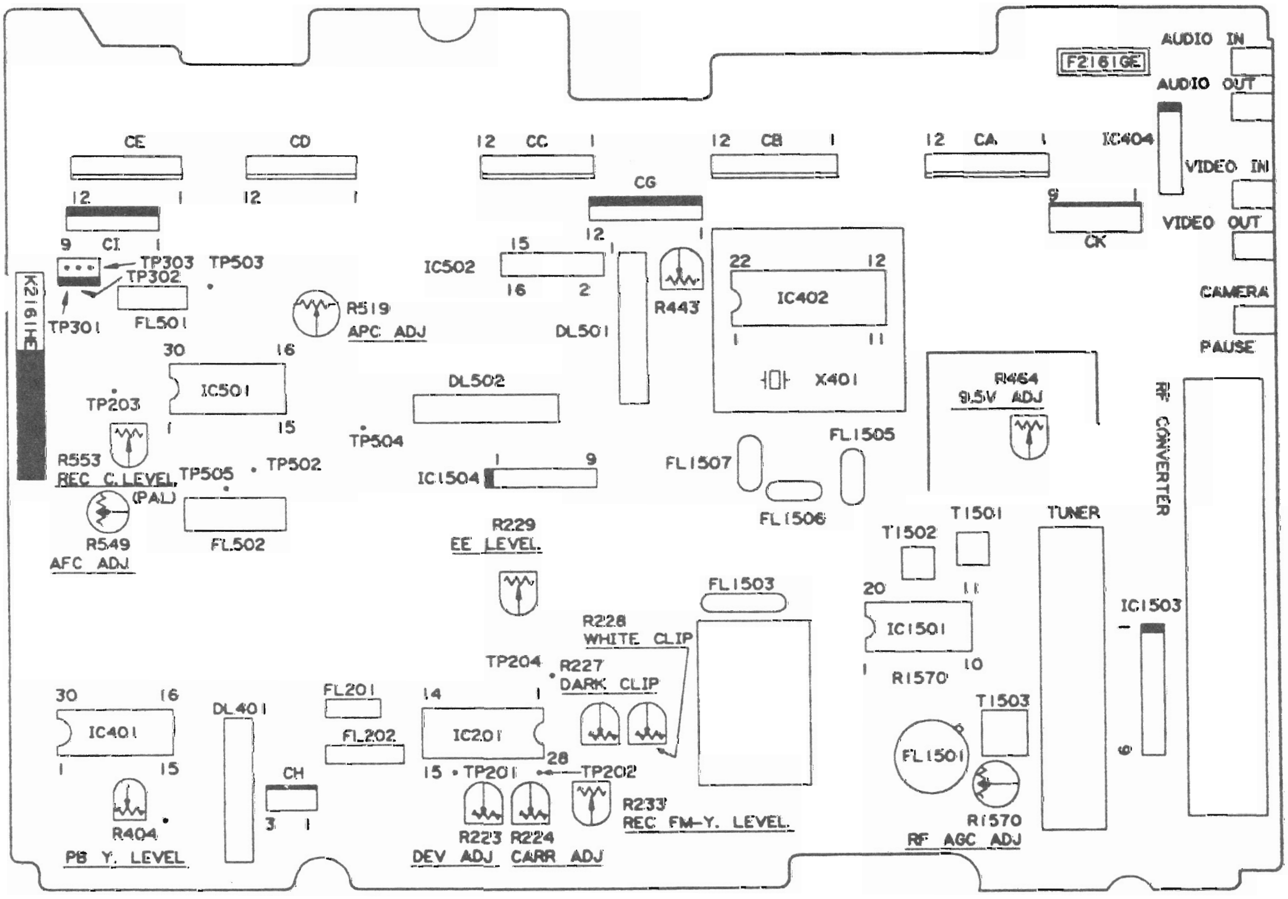


Figure 2-10.

Adjustment of FM carrier and deviation

Notes:

a. Do not perform this adjustment except after replacement of IC201 or when the carrier control (3.8MHz) or deviation control (1.0MHz) has been adjusted improperly.

b. Before this adjustment, make sure that the E-E level and playback brightness level have been adjusted as specified.

1. Set the input selector switch in the AUX mode. (with the AUX terminal given no signal).
2. Put the unit in the PAL SP record mode.
3. Connect a frequency counter to TP202, and adjust R224 (carrier control) so that the counter reads 3.8 ± 0.05MHz.
4. Apply a colour bar signal (stair-step waveform), then record and play it back.
5. Connect a 75 ohm resistor between the video output and ground, and observe the video output with an oscilloscope.
6. Adjust R223 (deviation control) so that the video playback level becomes 1.0 ± 0.05Vp-p. If the level is below 0.95Vp-p, turn the R223 counterclockwise. If the level is over 1.05Vp-p, turn the R223 clockwise.

Adjustment of dark clip and white clip

1. Put the unit in the PAL SP record mode, using an E-180 tape.
2. Apply a colour bar signal (stair-step waveform) to the unit.
3. Observe the output of TP201 with an oscilloscope, and adjust R228 (white clip control) so that white output overshoot is within 80 ± 5%, and then adjust R227 (dark clip control) so that dark output overshoot is within 50 ± 5%.

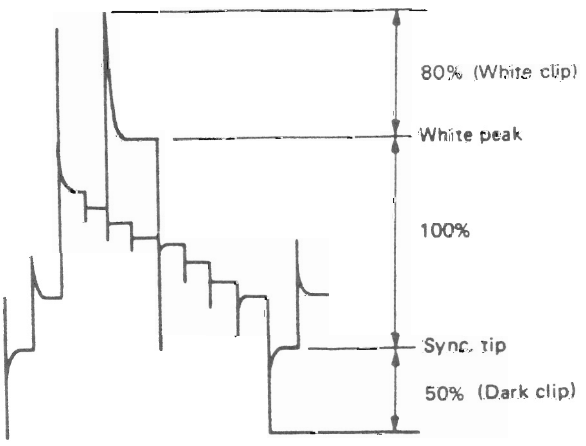


Figure 2-11.

Adjustment of automatic phase control (APC)

1. Put the unit in the PAL SP playback mode, using an alignment tape (VR5CPSV).
2. Apply a colour bar signal (stair-step waveform) to the unit, and connect a frequency counter to TP504.
3. Adjust R519 (APC control) so that the counter reads 4.433619 MHz.

Adjustment of automatic frequency control (AFC)

Note:

Connect a short clip between TP502 and TP503.

1. Put the unit in the PAL SP record mode, using an E-180 tape.
2. Apply a colour bar signal (stair-step waveform) to the unit, and connect a frequency counter to TP505.
3. Adjust R549 (AFC control) so that the counter reads 625 ± 5kHz.

Adjustment of record current

a) In the case of PAL 4.43MHz

Note:

Before the adjustment, turn R233 (record luminance level control) to minimize the record current.

1. Put the unit in the PAL SP record mode, using an E-180 tape.
2. Apply a colour bar signal to the unit.
3. Connect the plus sync slope of oscilloscope to TP31 for VR6843/56 (or TP301 for VR6643/59) and the minus sync slope to TP32 for VR6843/56 (or TP302 for VR6643/59) and observe the output waveforms available there.
4. Adjust R553 (record chroma level control) so that the output level is within 20.0 ± 2.0 mV for VR6843/56 or 27.5 ± 2.0 mV for VR6643/59.

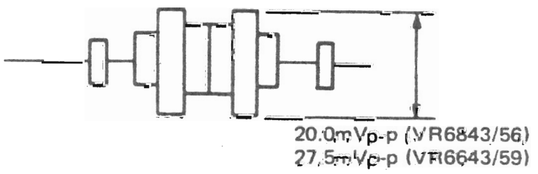


Figure 2-12.

b) In the case of NTSC 3.58MHz (VR6843/56) (refer to chroma circuit, Fig. 3-4)

Note:

Before the adjustment, turn R233 (record luminance level control) to minimize the record current.

1. Put the unit in the NTSC SP record mode, using an E-180 tape.
2. Apply a colour bar signal to the unit.
3. Connect the plus sync slope of the oscilloscope to TP31 and the minus sync slope to TP32, and observe the output waveforms available there.

Adjust R5810 (3.58MHz record chroma level control) so that the output level is within 25 ± 2.0mV.

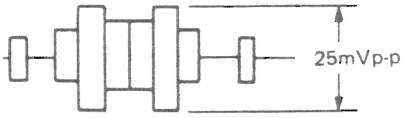


Figure 2-13.

In the case of SECAM (VR6843/56)
(refer to chroma circuit, Fig. 3-4)

Note:
Before the adjustment, turn R233 (record luminance level control) to minimize the record current
Put the unit in the SECAM SP record mode, using an E-180 tape.

. Apply a colour bar signal to the unit.

. Connect the plus sync slope of oscilloscope to TP31 and the minus sync slope to TP32 and observe the output waveforms available there.

. Adjust R5813 (SECAM record chroma level control) so that the output level is within 16 ± 2mV.

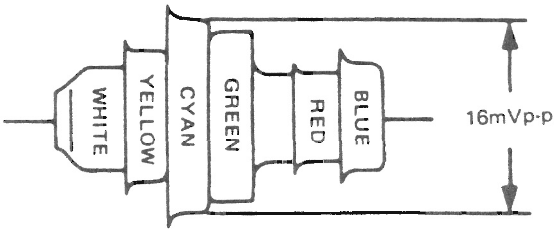
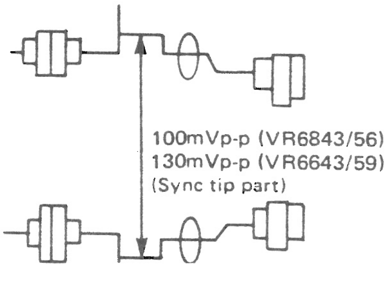


Figure 2-14.

d) Adjustment of record luminance level

1. Put the unit in the PAL SP playback mode, using an E-180 tape.
2. Apply a colour bar signal to the unit.
3. Connect the plus sync slope of oscilloscope to 1 for VR6843/56 (or TP301 for VR6643/59) and the minus sync slope to TP32 for VR6843/56 (or TP302 for VR6643/59) and observe the output waveforms available there.
4. Adjust R233 (record luminance level control) so that the output level is within 100 ± 10mV for VR6843/56 or 130 ± 10mV for VR6643/59.



Adjustment of playback luminance level

Note:
The video output must be terminated with a resistor of 75 ohms.

1. Put the unit in the PAL SP playback mode, using an alignment tape (VRσCPSV).
2. Observe the video output with an oscilloscope.
3. Adjust R404 (playback luminance level control) so that the output level is 1.0 ± 0.05Vp-p.

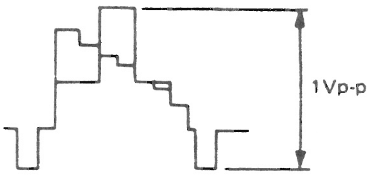


Figure 2-16.

Adjustment of video level (NTSC trick mode)(VR6843/56)

1. Record an NTSC colour signal using an E-180 tape and play it back, then put the unit in the still mode.
2. Observe the output of TP701 (head switching pulse) and video output with an oscilloscope.
3. Adjust R443 so that there is a video level difference of ± 0.1V between Channel-1 output (head switching pulse's High level) and Channel-2 output (head switching pulse's Low level).
4. If the colour flicker is so noticeable on the TV monitor, finely adjust R443 so that there is the least deviation of flicker on the screen.

ADJUSTMENT OF CHROMA CIRCUIT

• Test point layout

(CHROMA PWB) —DUNTK2160HE—

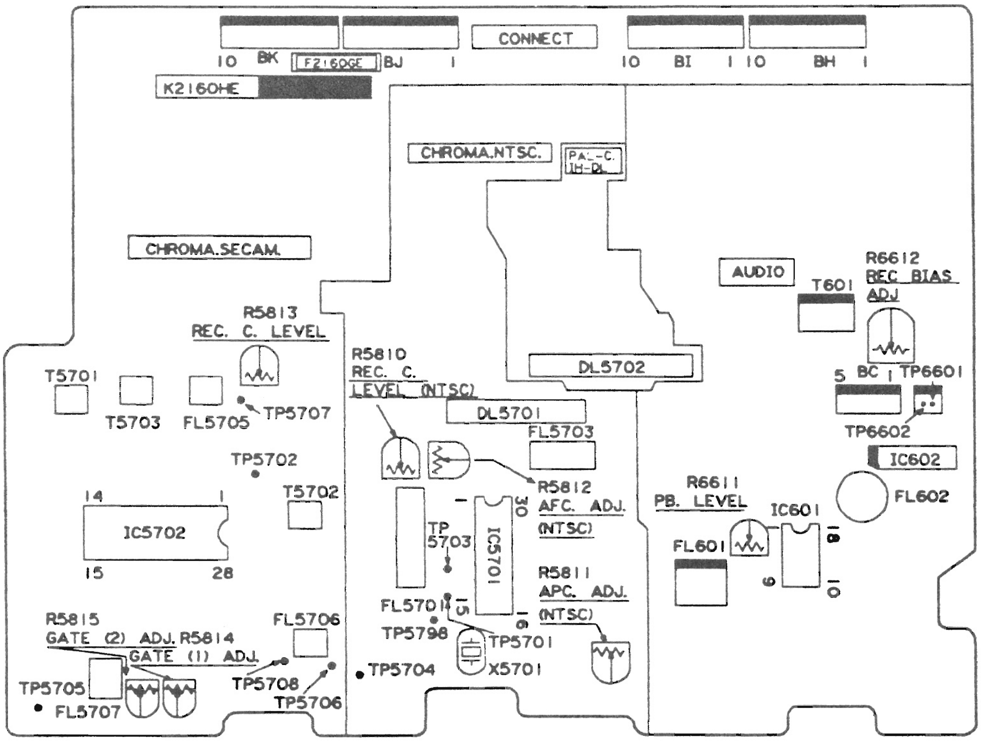


Figure 2-17.

■ ADJUSTMENT OF NTSC 3.58 CIRCUIT (VR6843/56)

Adjustment of AFC (R5812)

1. Apply a NTSC colour bar signal to the video input terminal.
2. Put the unit in the SP stop mode, and short TP5703 and TP5706.
3. Connect a frequency counter to TP5701 and adjust R5812 so that the counter reads 629 kHz.

Adjustment of APC (R5811)

1. Playback a NTSC tape (pre-recorded) in the SP mode and connect a frequency counter to TP5703.
2. Adjust R5811 so that the counter reads 3.579545 MHz (± 50 kHz).

Adjustment of colour record current (R5810)

1. Connect an oscilloscope to TP31 and TP32 (GND) of the head amplifier, and apply a NTSC colour bar signal to record it.
2. Set R233 (record luminance level control) at the minimum position and adjust R5810 so that the output is 25mVp-p.
3. Return R233 to the position which gives the output of 100mVp-p.

■ ADJUSTMENT OF SECAM CIRCUIT

Adjustment of record bell filter (T5703)

1. Connect an oscilloscope to TP5708.
2. Apply a SECAM colour bar signal to the unit and record it in the SP mode.
3. Adjust T5703 so that the output of chroma signal becomes flat as shown in Fig. 2-18.

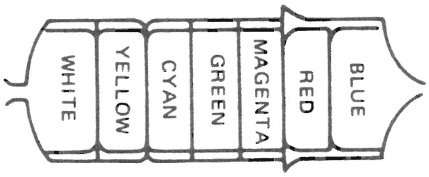


Figure 2-18.

Adjustment of record gate (R5814, R5815)

1. Apply a SECAM colour bar signal to the unit and record it in the SP mode.
2. Connect an oscilloscope to TP5702 and TP5705, and check that the output of chroma signal is as shown in Fig. 2-19.
3. Adjust R5814 and R5815 so that the intervals T_1 and T_2 become 2μsec and 4.2μsec respectively.

Adjustment of record equalizer (T5702) (VR6843/56)

Adjust T5702 so that the output at the point ⓐ is as shown in Fig. 2-19.

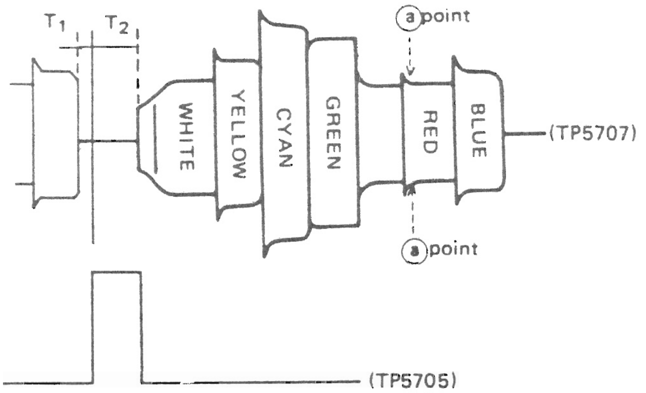


Figure 2-19.

Adjustment of SECAM colour record current (R5813) (VR6843/56)

1. Connect an oscilloscope to TP31 and TP32 (GND) of the head amplifier, and apply a SECAM colour bar signal to record it in the SP mode.
2. Set R233 (record luminance level control) at the minimum position and adjust R5813 so that the output is 16 mVp-p.
3. Return R233 to the position which gives the output of 100 mVp-p.

Adjustment of playback equalizer (T5701)

1. Playback a SECAM colour tape (pre-recorded) in the SP mode and connect an oscilloscope to TP5708 and TP5705.
2. Adjust T5701 so that the amplitude difference among each chroma signal becomes the least as shown in Fig. 2-20.

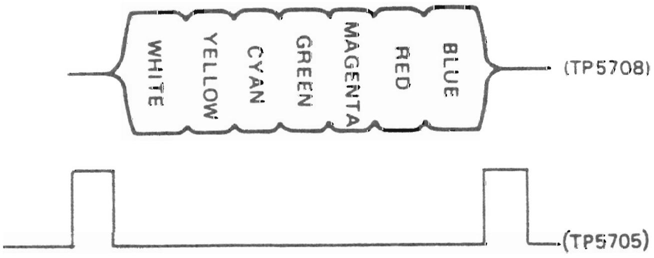


Figure 2-20.

ADJUSTMENT OF TUNER/IF, AUDIO CIRCUIT

■ TUNER IF ADJUSTMENT

Caution:

Do not perform this adjustment except when either of the tuner, detection coil (T1501) and AFT coil (T1502) is replaced with a new one.

If any one of the above parts is replaced, perform the adjustment as follows.

1. Receive PAL broadcast and turn on AFT switch.
2. Connect an oscilloscope to pin ① of IC1504, and adjust the core belonging to the replaced part so that the burst level of video signal is equal to 1/2 of the horizontal sync level. See Fig. 2-21.
3. Readjust R1570 (RF AGC).

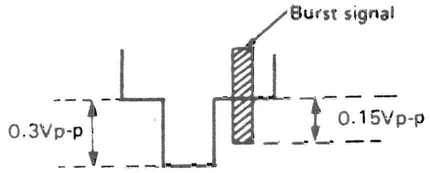


Figure 2-21.

Adjustment of RF AGC

Turn R1570 to the position where the waveform of horizontal sync signal shown in Fig. 2-21 begins to contract.

■ AUDIO ADJUSTMENT

Adjustment of record bias current (R6612)

1. Connect a VTVM to TP6601(−) and TP6602(+).
2. Adjust R6612 so that the VTVM reads 2.3 mV.

Adjustment of playback audio level (R6611)

1. Connect a VTVM to the audio output terminal and playback an alignment tape (VR8CPSV).
2. Adjust R6611 so that the VTVM reads −9 dBm.

Adjustment of NTSC audio trap

1. Receive NTSC broadcast signal.
2. Connect an oscilloscope to pin ⑯ of IC1501.
3. Turn T1501 so that there appears the least deviation of noise on the oscilloscope (for the horizontal sync of video signal) in the audio mode.

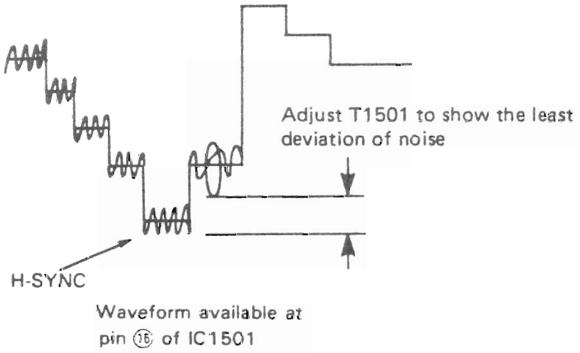
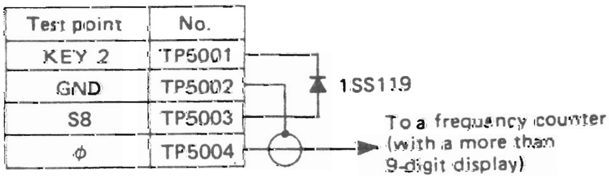

Adjust T1501 to show the least deviation of noise
H-SYNC
Waveform available at pin ⑯ of IC1501

Figure 2-22.

■ ADJUSTMENT OF TIMER CIRCUIT

Note:
This model is equipped with a crystal oscillator (32 kHz) type timer.
The following adjustment is needed when the timer IC has been replaced or if there is a time count error for some reason. (Notice that the unit has been accurately factory-adjusted. Do not attempt to readjust this circuit if not needed.)

Before starting the adjustment, make the following connections with the test point connector of the timer PWB.



Test point	No.
KEY 2	TP5001
GND	TP5002
S8	TP5003
Φ	TP5004

Figure 2-23.

Timer adjustment

1. Couple the connector in position on the timer PWB.
2. Press the ACL switch on the timer PWB. (Now the digitron display willl turn off.)
3. Adjust C5011 (trimming capacitor) so that the frequency counter may read the values listed below.
4. Finally disconnect the connector from the timer PWB. (Flashing → Timer preset)

Condition	Adjustment value	Remarks
10–15°C	16383.962 ± 0.019 Hz	(Pace) −0.2 ± 0.1 sec/day
Highter than 15°C	16384.019 ± 0.019 Hz	(Pace) +0.1 ± 0.1 sec/day

Post-adjustment checking
Half a day to three days after the adjustment, check the accuracy for extra surety.

VR6843/56

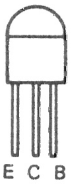
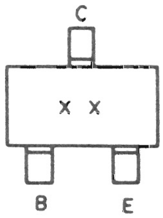
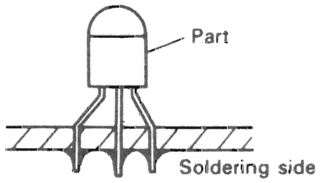
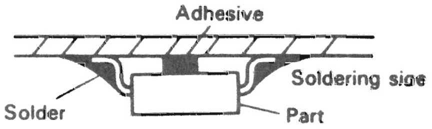
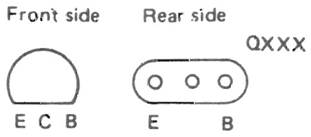
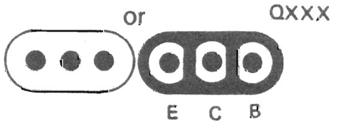
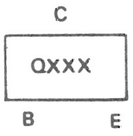
NFORMATION ABOUT SMALL CHIP PARTS

he 350N Series VCR we have released this time uses those circuit boards amply equipped with small chip parts, vhich have so far been used only in some circuits.

ı future small chip parts are expected to be used more and more; but they require no special servicing techiques, and we think they can be serviced in the same manner as ordinary parts. Hereunder are given the details f small chip parts and their servicing procedures.

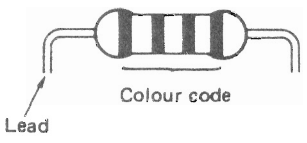
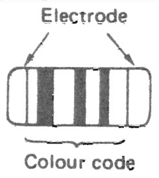
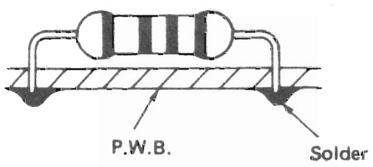
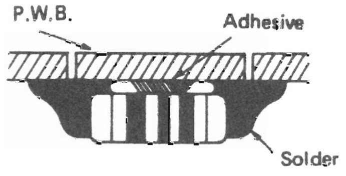
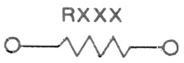
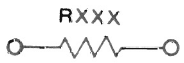
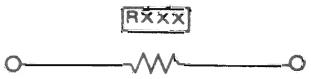
Difference of Small Square Chip Parts (or Leadless Parts) against Ordinary Parts (with Leads).

Chip Transistor

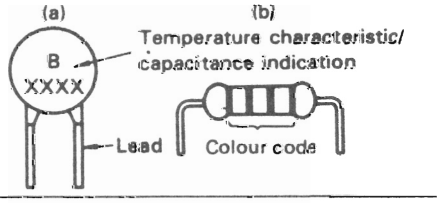
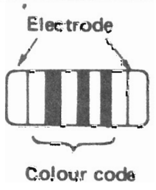
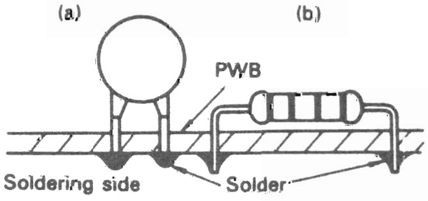
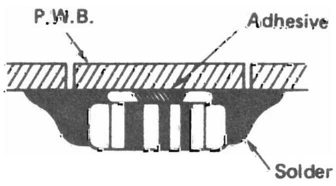
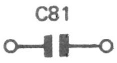
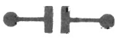
Item	Ordinary transistor	Chip transistor
Part No. (13-digit cord)	VS2SAxxxxxx1E VS2SCxxxxxx1E VSDTAxxxEK/-1 VSDTCxxxEK/-1	Same as left
Appearance		
Attachment on PWB	 Affix to the front of the PWB.	 Affix to the soldering side of the PWB.
Symbol as used in the wiring diagram		
Symbol as used in the parts layout drawing		

Note: B; base electrode
C; collector
E; emitter

- **Round Chip Resistor**

Item	Ordinary resistor	Round chip resistor
Part No. (13-digit cord)	VRD-RA2BExxxJ	VRD-MN2BExxxJ
Appearance		
Attachment on PWB	 Affix to the front of the PWB.	 Affix to the wiring side of the PWB.
Symbol as used in the wiring diagram		
Symbol as used in the parts layout drawing		

- **Round Chip Capacitor**

Item	Ordinary capacitor	Round chip capacitor
Part No. (13-digit cord)	VCKYPB1HBxxxK VCCSAT1HLxxxK VCKYAT1HBxxxK (1EX)	VCCCMN1HLxxxK ———— (H)— (J) VCKYMN1CYxxxN VCKYMN1HBxxxK
Appearance	 (a) (b) Temperature characteristic/capacitance indication B XXXX Lead Colour code	
Attachment on PWB	 Affix to the front of the PWB.	
Symbol as used in the wiring diagram		
Symbol as used in the parts layout drawing		Same as for the round chip resistor

■ Method of marking chip parts

The method of marking chip parts is not yet unified among manufacturers, so it is different from manufacturer to manufacturer.

At present each manufacturer uses the following marking method for principal parts, however.

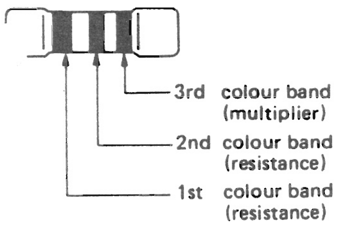
Identification of Chip Parts

- **Transistors**

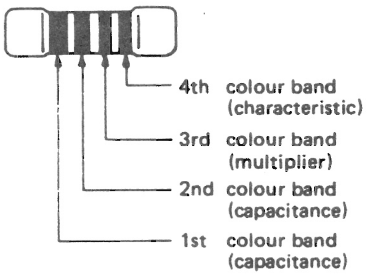
Designation	Parts Code	Designation	Parts Code
L 5	VS2SC1623L51E	Q0	VS2SC2714-01E
M 5	VS2SA812-M51E	26	VSDTC144K/-1
N E	VS2SD1306-E1E	15	VSDTA124EK/-1

colour band / Colour	1st colour band	2nd colour band	3rd colour band		4th colour band (for capacitor only)
			Resistor	Capacitor	
Black	0	0	10^{0} (X 1 ohm)	10^{0} (X 1PF)	○(CH)
[illegible]own	1	1	10^{1} (X 10 ohm)	10^{1} (X 10PF)	—
Red	2	2	10^{2} (X 100 ohm)	10^{2} (X 100PF)	—
Orange	3	3	10^{3} (X 1K ohm)	10^{3} (X 1000PF)	—
Yellow	4	4	10^{4} (X 10K ohm)	10^{4} (X 10000PF)	○(RH)
Green	5	5	10^{5} (X 100K ohm)	—	—
Blue	6	6	10^{6} (X 1M ohm)	—	—
Violet	7	7	10^{7} (X 10M ohm)	—	○(UJ)
Gray	8	8	10^{8} (X 100M ohm)	—	—
White	9	9	10^{9} (X 1000M ohm)	—	—
Gold	—	—	10^{1} (X 0.1 ohm)	10^{-1} (X 0.1PF)	—
Silver	—	—	—	10^{-2} (X 0.01PF)	—

Resistor


3rd colour band (multiplier)
2nd colour band (resistance)
1st colour band (resistance)

Capacitor


4th colour band (characteristic)
3rd colour band (multiplier)
2nd colour band (capacitance)
1st colour band (capacitance)

Note 1: If a capacitor has no 4th colour band indication on it, its characteristic is of usual specification.

Note 2: If a resistor has not any colour band indication on it, this can be used as a jumper.

■ Servicing of Small Chip Parts

Removal of Square-Shaped Chip

1. Using a soldering iron, heat the solder at tach terminal of the chip to get it absorbed into a braided wire applied thereon. See Fig. 56.
2. Holding the chip with a pincette, take it off gently using the soldering iron's heat applied on each terminal of it. See Fig. 57.

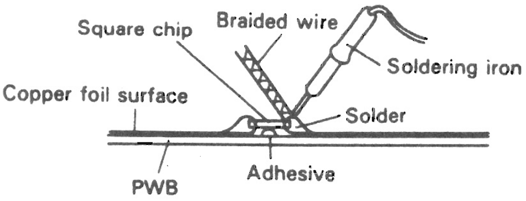


Figure 56.

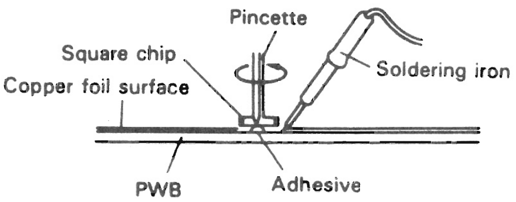


Figure 57.

Caution on removal:

1. When handling the soldering iron, use suitable pressure and be careful.
2. When removing the chip, do not use undue force with the pincette.
3. The soldering iron in use should be a 30W one: it is best if provided with a thermal control (about 280°C).
4. The chip once removed must not be used again.

Attachment of Square Shaped Chip

1. Temporarily solder one terminal of the chip on the copper foil surface. See Fig. 58.
2. Holding one end of the chip with a pincette, completely solder both terminals of it, one after the other. See Fig. 59.

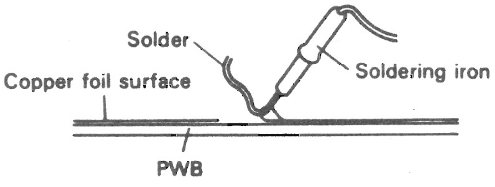


Figure 58.

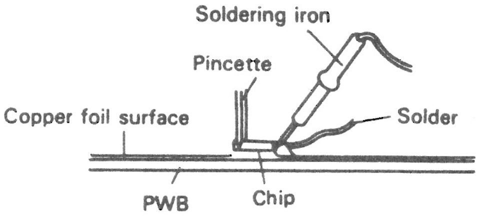


Figure 59.

Cautions on attachment:

1. When soldering the chip terminals, do not touch them directly with the soldering iron. The soldering must be as quick as possible being careful not to hurt the terminals and the body itself.
2. When touching the square chip with a pincette, hold its terminal but never its body.
3. Keep the chip's body in contact with the PWB when soldering.
4. The soldering iron in use should be a 30W one: it is best if provided with a thermal control (about 280°C).
5. The soldering should not be made outside the specified area.
6. Soldering flux (of rosin) may be used but shall not be acid.
7. After soldering, let the chip cool down gradually at room temperature.
8. The soldering amount should be proper: with an excessive amount the chip may be cracked and subject to other troubles (curvature of PWB, cramp of terminals, etc.). See Fig. 60.

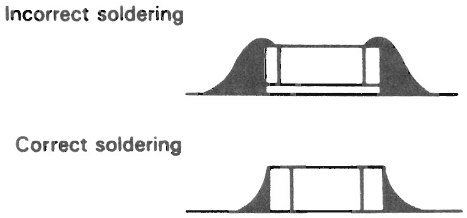


Figure 60.

General Cautions on Handling and Storage

1. Oxidization on the chip's terminals results in poor soldering. Do not handle them with bare hands.
2. For strage, avoid the following places where oxidization will occur, and their capacitance and resistance will deteriorate.
   1) In areas with sulfur or chiorine gas
   2) Directly sunlit places
   3) High temperature/high humidity places

   If substitutes for small chip parts are not avilable, the ordinary parts with lead can be used instead. When attaching parts with lead which have a chance of touching other parts, be sure to cover the lead with insulating tube.

SCHEMATIC DIAGRAM

IMPORTANT SAFETY NOTICE:

BE SURE TO USE GENUINE PARTS FOR SECURING THE SAFETY AND RELIABILITY OF THE SET. PARTS MARKED WITH " ⚠ " AND PARTS SHADED (IN BLACK) ARE ESPECIALLY IMPORTANT FOR MAINTAINING THE SAFETY AND PROTECTING ABILITY OF THE SET.

BE SURE TO REPLACE THEM WITH PARTS OF SPECIFIED PART NUMBER.

SAFETY NOTES:

1. *DISCONNECT THE AC PLUG FROM THE AC OUTLET BEFORE REPLACING PARTS.*
2. *SEMICONDUCTOR HEAT SINKS SHOULD BE REGARDED AS POTENTIAL SHOCK HAZARDS WHEN THE CHASSIS IS OPERATING.*

NOTES:

1. *The unit of resistance "ohm" is omitted (k = 1000 ohm, M = 1 Meg ohm).*
2. *All resistors are 1/8 watt, unless otherwise noted.*
3. *The unit of capacitance "F" is omitted (µ = µF, p = µµF).*

VOLTAGE MEASUREMENT CONDITIONS:

1. *DC voltages are measured between points indicated and chassis ground by VTVM, with AC220V/50Hz supplied to unit and all controls are set to normal viewing picture unless otherwise noted.*
2. *Voltages are measured with 10000µV B & W or colour signal.*

WAVEFORM MEASUREMENT CONDITIONS:

10000µV 87.5 percent modulated colour ber signal is fed into tuner:

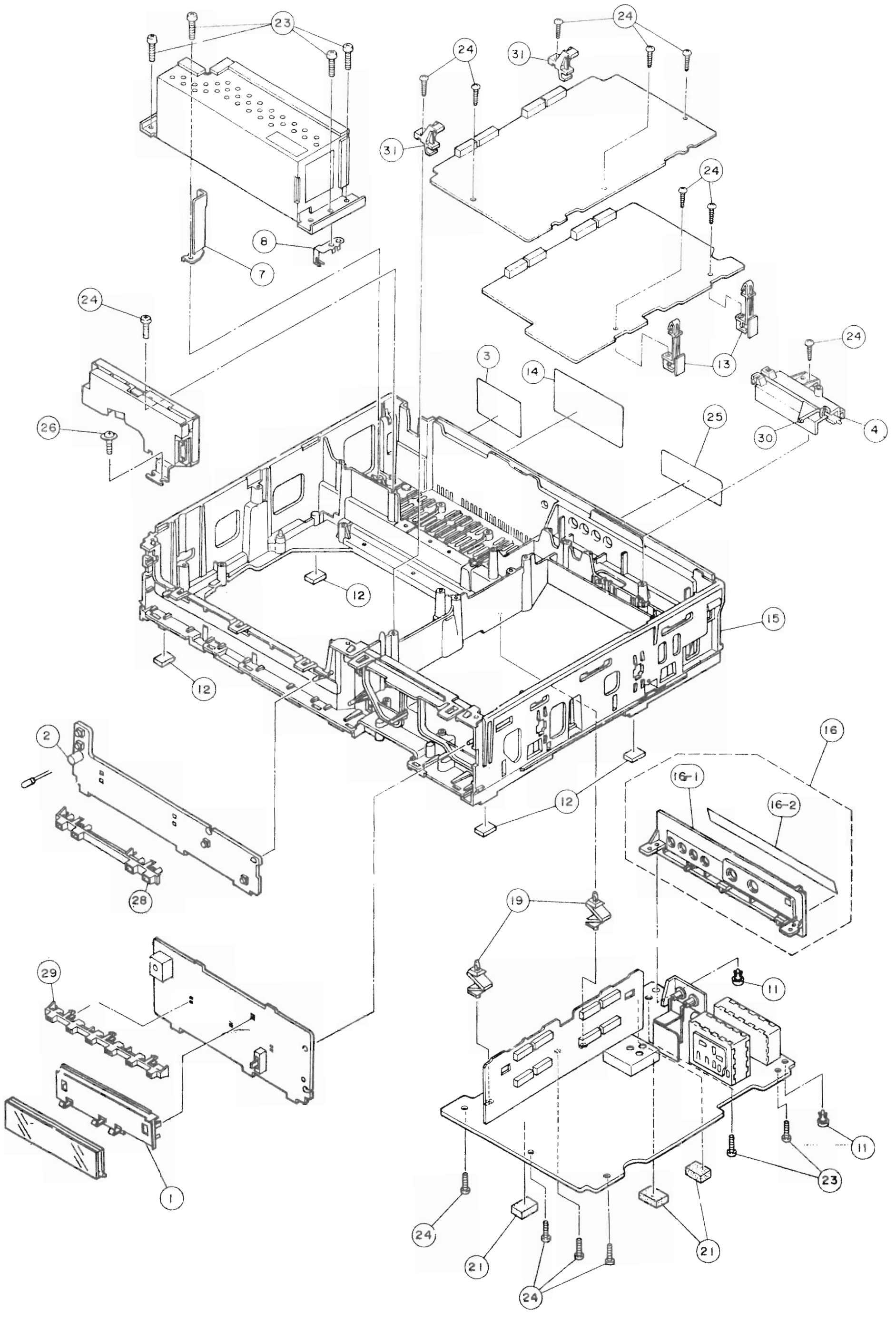
CAUTION:

This circuit diagram is original one. Therefore there may be a slight difference from yours.

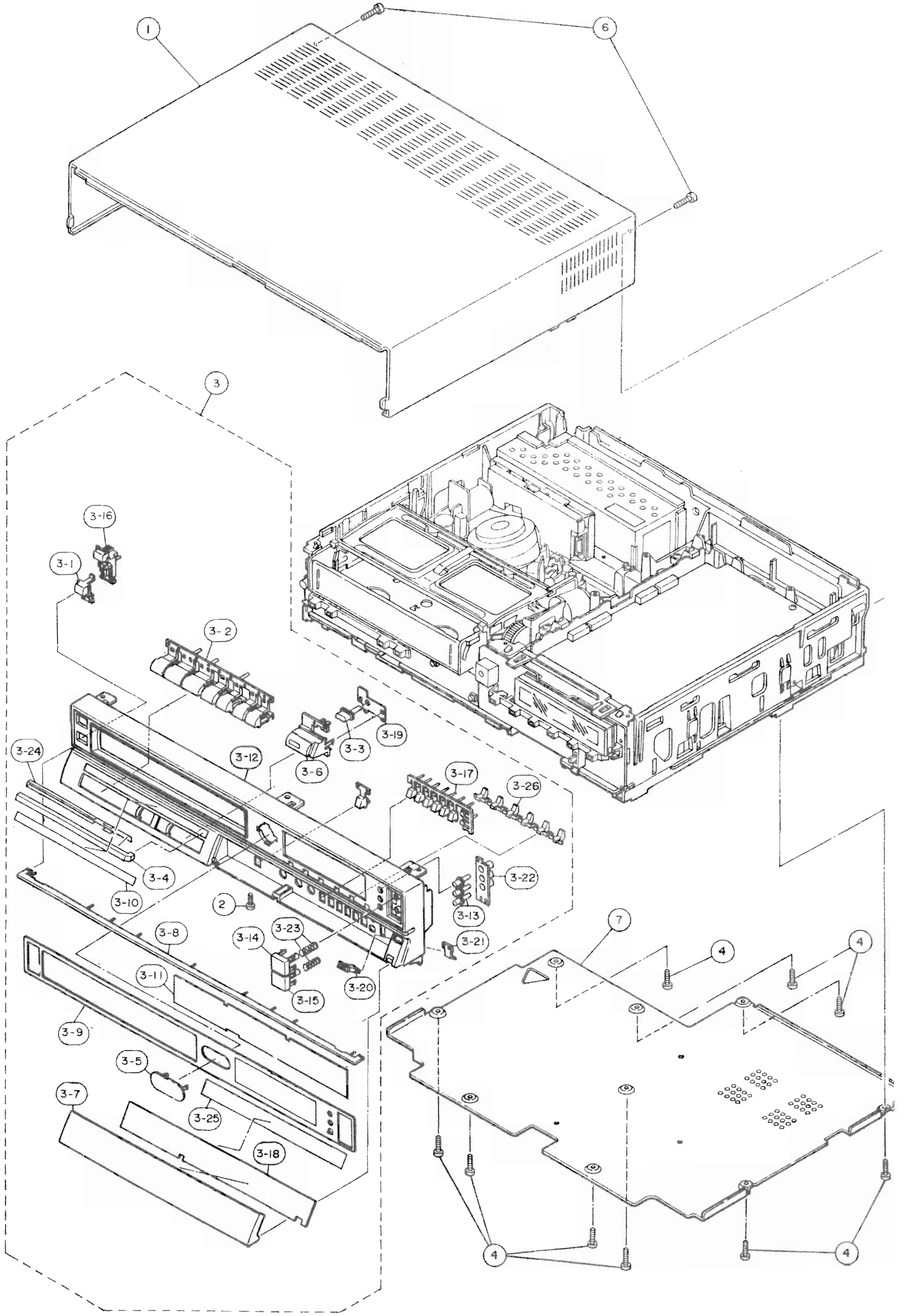
GLOSSARY

	Abbreviation	
A	ABSS	Auto Blank Section Scan
	AFC	Automatic Frequency Control
	AFT	Automatic Fine Tuning
	AGC	Automatic Gain Control
	ALC	Automatic Level Control
	APC	Automatic Phase Control
	AD	Address
	AL	After Loading
	ACL	All Clear
	AT	All Time
	AV (A/V)	Audio/Video
	A-Mute	Audio Mute
C	CAP	Capstan
	CAP.M.	Capstan Motor
	C.FG	Capstan Frequency Generator
	C.PG	Capstan Pulse Generator
	CST	Cassette
	CST.M.	Cassette Motor
	CSA	Cassette Switch-A
	CSB	Cassette Switch-B
	CSD	Cassette Swtich-D
	CH	Channel
	CTL	Control
D	D.D.	Direct Drive
	D.F.F.	D-Flip-Flop
	DM	Drum Motor
	D.FG	Drum Frequency Generator
	D.PG	Drum Pulse Generator
	D.TPG	Drum Trapezoidal Generator
	DET	Detector
	DUB	Dubbing
E	EE	Electric to Electric
	EF	Emitter Follower
	EP	Extended Play
	ES	End Sensor
F	F-ADV-P	Frame Advance Pulse
	FWD	Forward
	F/R	Forward/Reverse
	FF	Fast Forward
	FM	Frequency Modulation
	F.G.	Frequency Generator
	F.E.	Full Erase
	FV	False Vertical Sync.
H	HIFI	High Fidelity
	HPA	High Pass Amplifier
	HPF	High Pass Filter
	HS (H/S)	Half Speed
	HSP	Head Switching Pulse
	H. SYNC	Horizontal Sync.
I	ID	Identical Amplifier
	IF	Intermediate Frequency
J	J.K.F-F	J.K.Flip-Flop
K	KE	Key Entry
L	LED	Light Emitting Diode
	LDM	Loading Motor
	LPF	Low Pass Filter
	LP	Long Play
M	MIC	Microphone
	MM	Mono-multi Vibrator
N	NC	Non Connection
	NS (N/S)	Normal Speed
O	OSC	Oscillator
P	PAD	Power Assisted Drive
	PAM	Pulse Amplitude Modulation
	PCM	Pulse Code Modulation Pulse Count Modulation
	PDM (PWM)	Pulse Duration Modulation Pulse Width Modulation
	PFM	Pulse Frequecny Modulation
	PPM	Pulse Phase Modulation
	PB	Playback
	PG	Phase Generator
	PR	Pinch Roller
	PWB	Printed Wiring Board
R	REC	Record
	REM (R/C)	Remote Control
	REV	Reverse
	REW	Rewind
	RF	Radio Frequency
S	S/H	Sample and Hold
	SN	Signal to Noise
	SP	Standard Play
	SS	Start Sensor
	SSVM	Solid State Voltmeter
	STILL-H	Still Mode High Level
	SUP-REEL	Supply Reel
	SW	Switch/Switching
T	TPG	Trapezoidal Generator
	TU-REEL	Take-up Reel
U	UL	Unloading
	UR	Un regulated
V	VCO	Voltage Controlled Oscillator
	VCR	Voltage Controlled Resistor
	V-MUTE	Video Mute
	V-LOCK	Vertical Lock for False Vertical Sync Signal
	VS (PS)	Video Search (Pictue Scan)
	VSF	Video Search Forward
	VSR	Video Search Reverse
	VTVM	Vacuum Tube Voltmeter

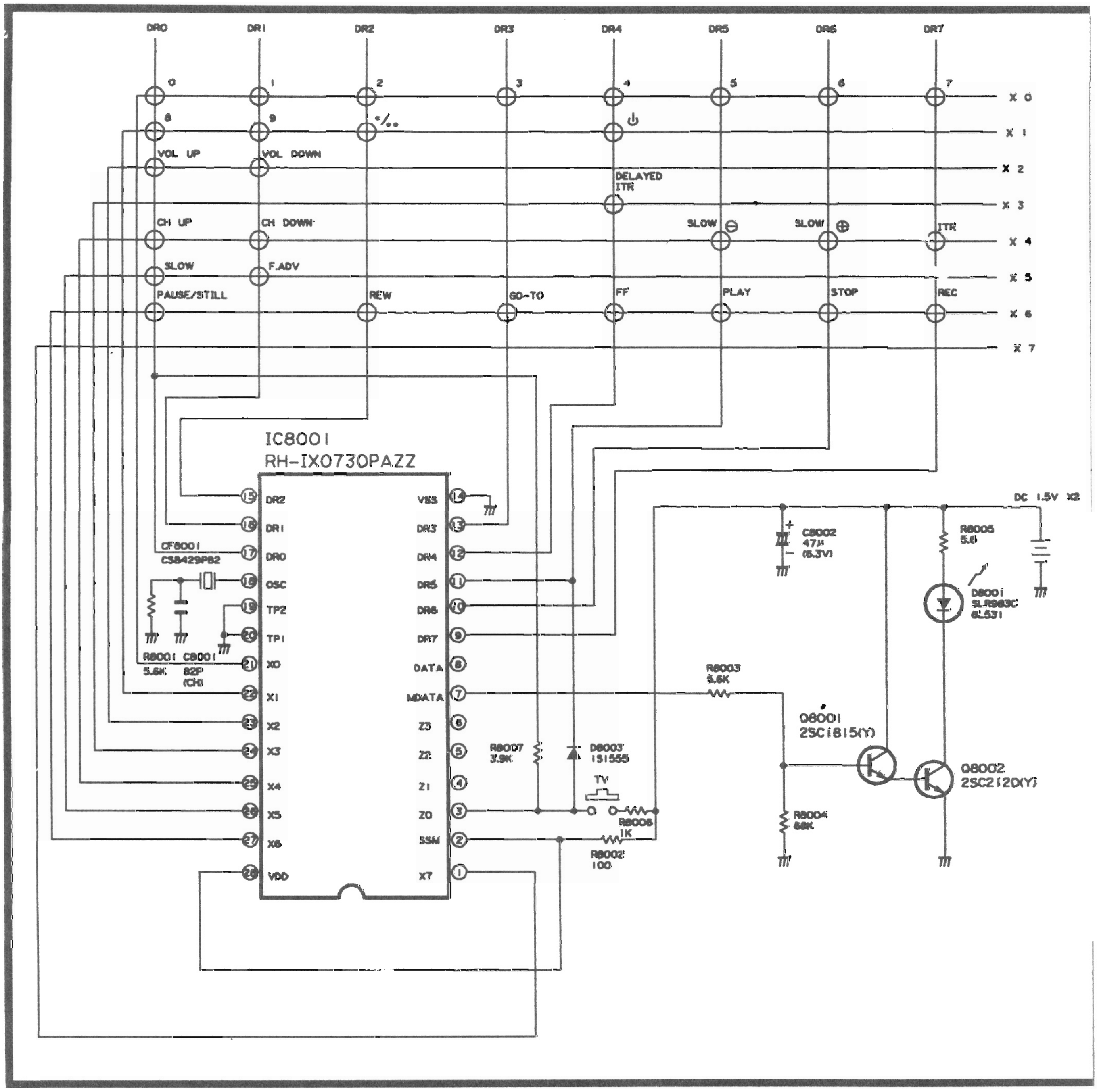
MECHANICAL PARTS DIAGRAM



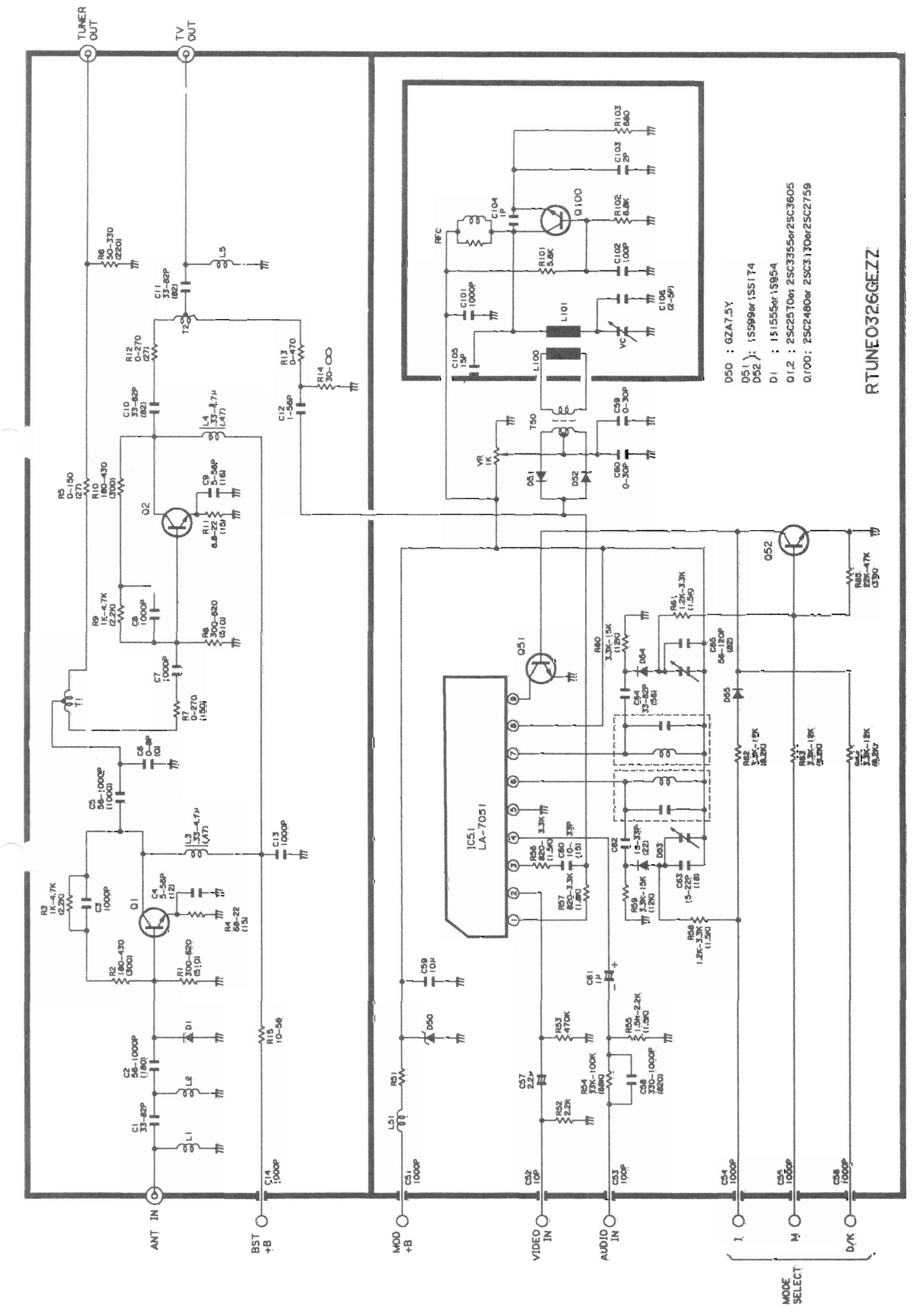
CABINET PARTS DIAGRAM



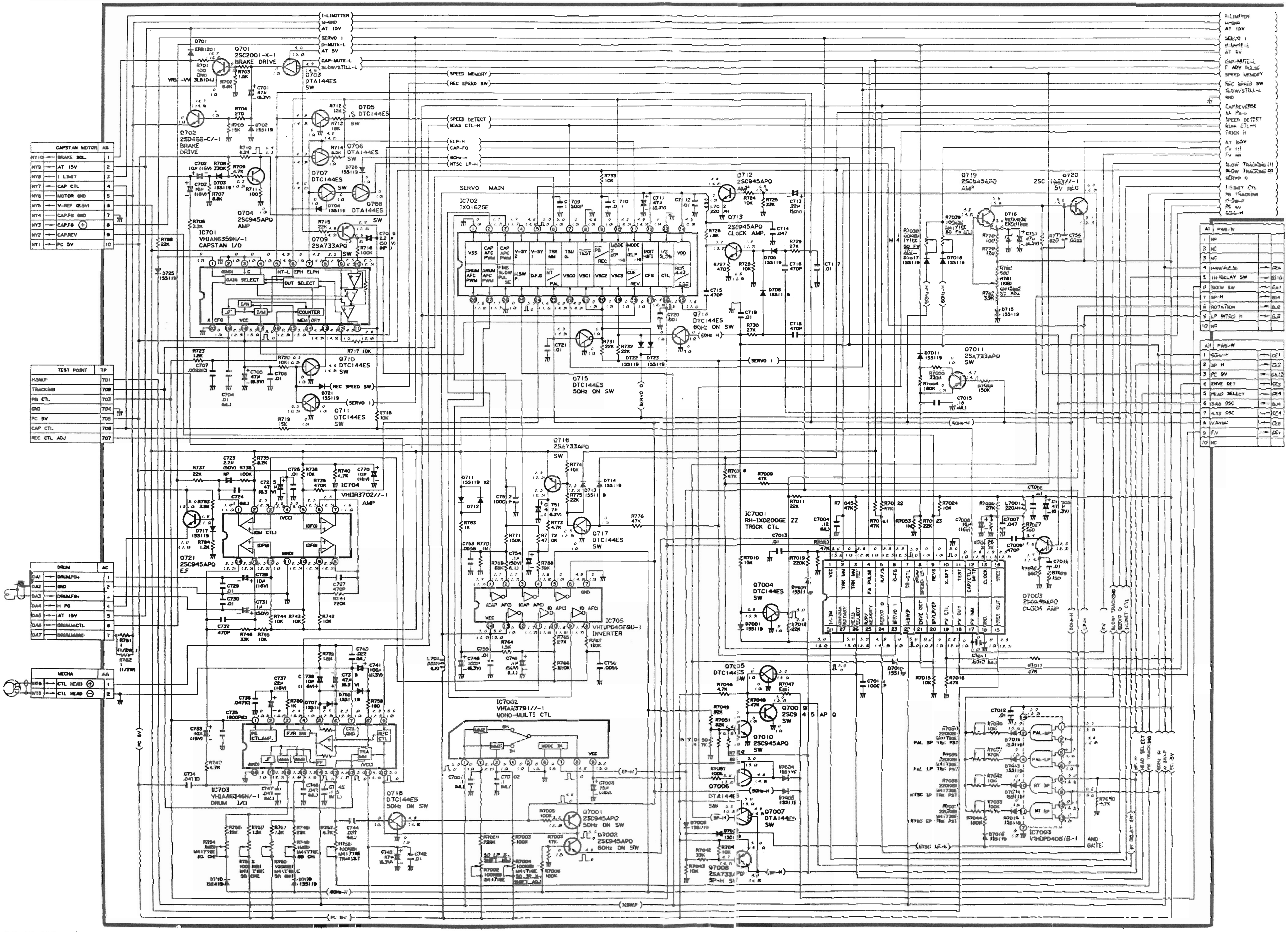
REMOTE CONTROL CIRCUIT DIAGRAM



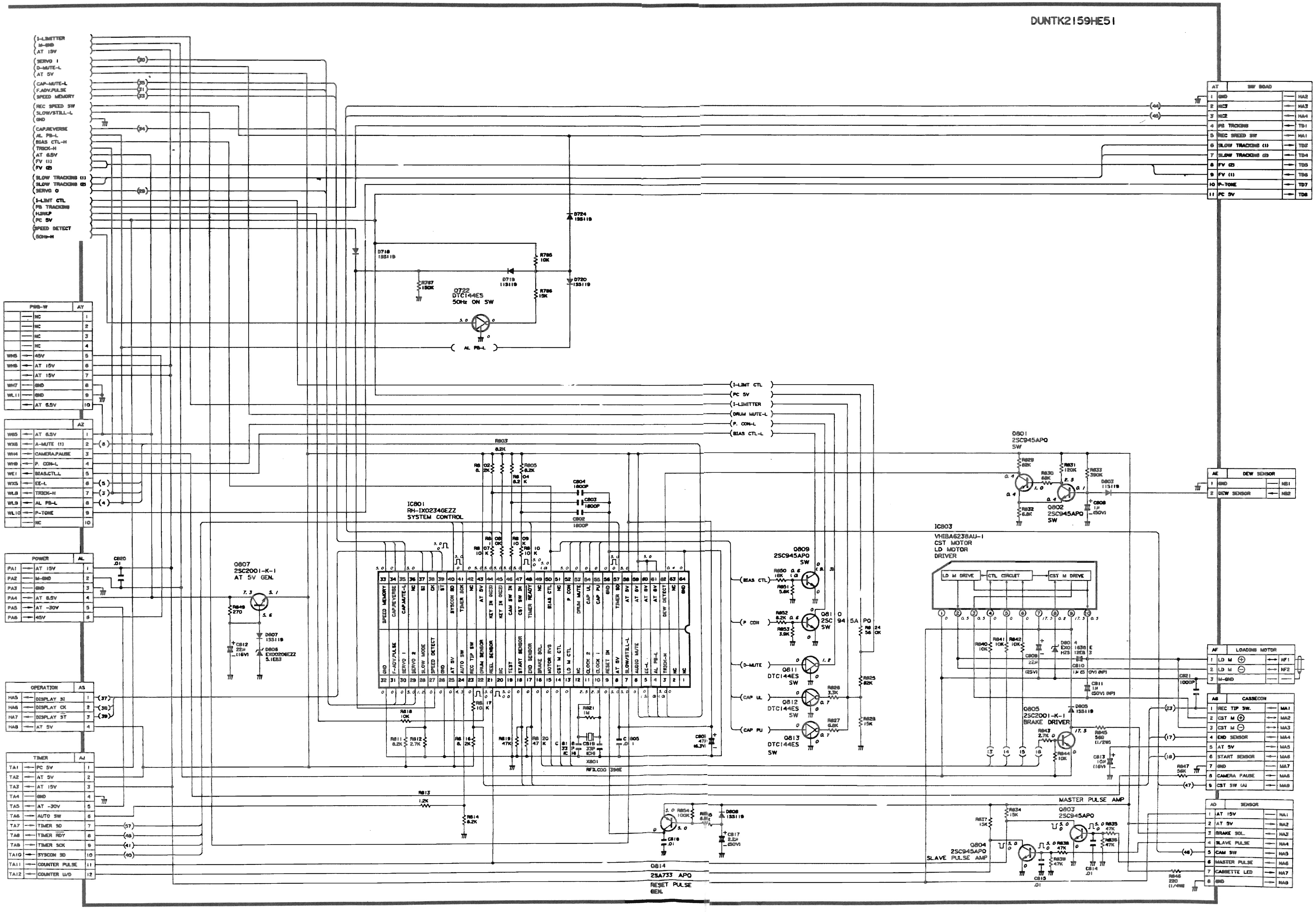
RF CONVERTER SCHEMATIC DIAGRAM



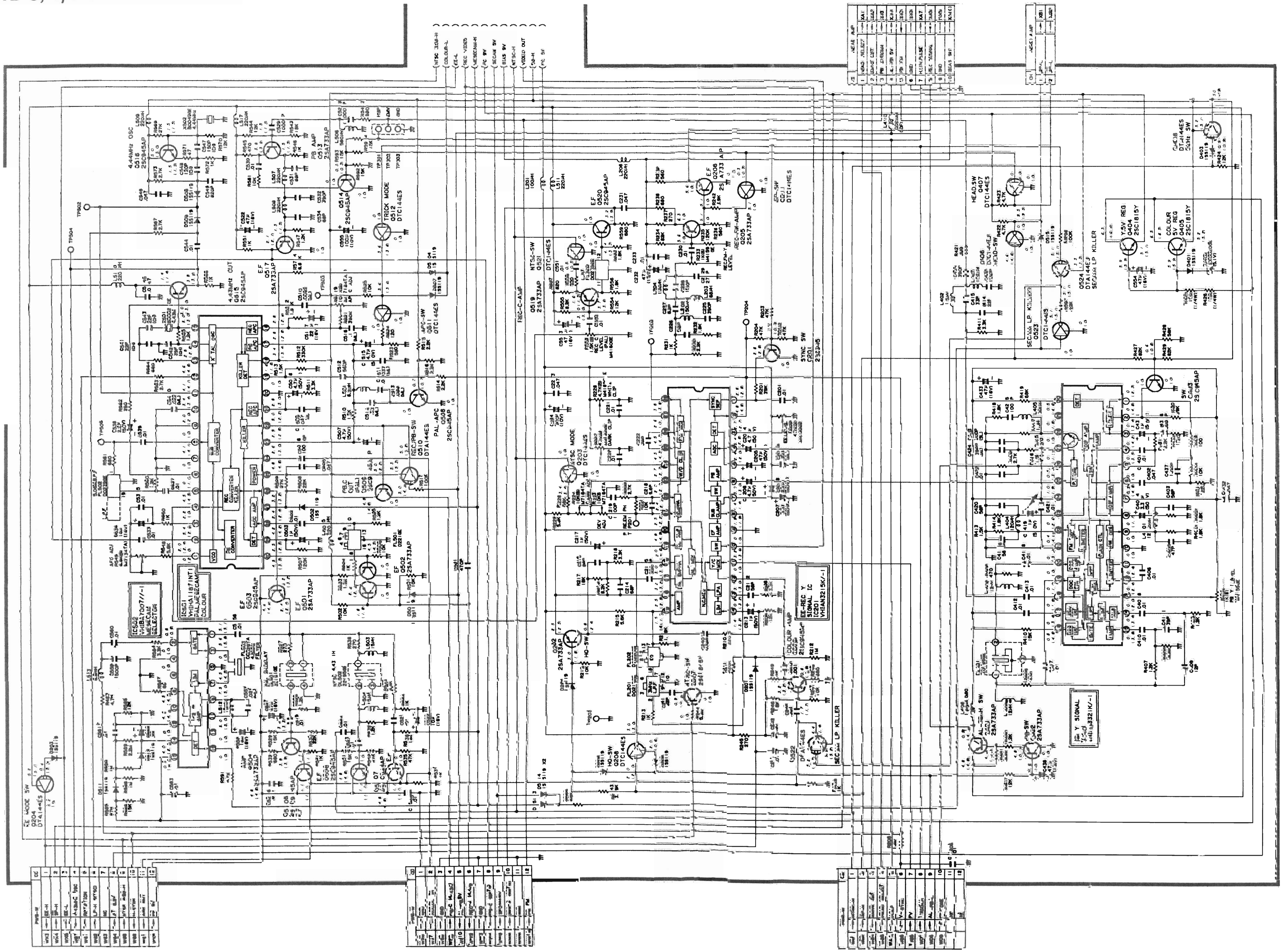
PWB-A, SERVO CIRCUIT DIAGRAM



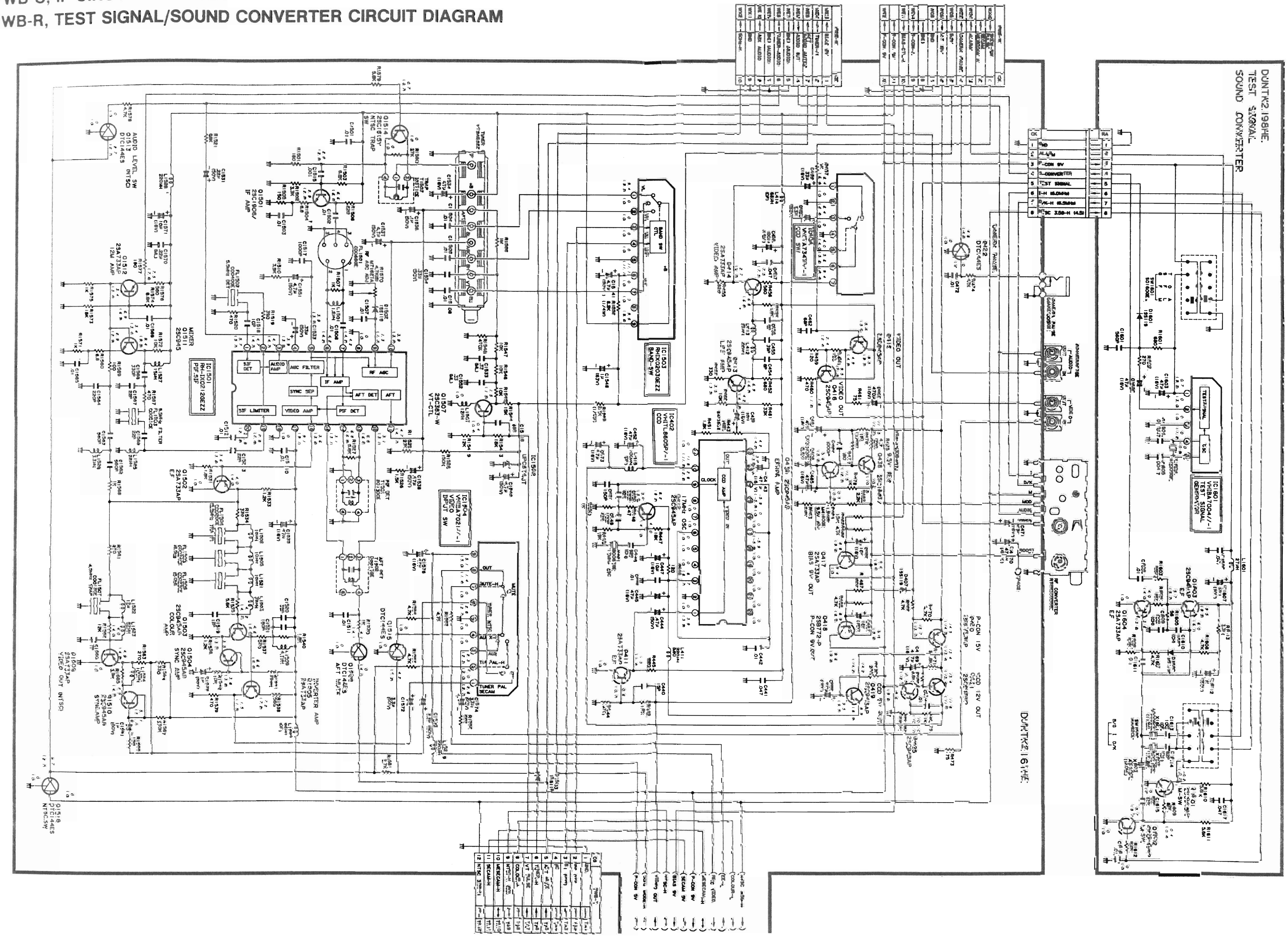
PWB-A, SYSTEM CONTROL CIRCUIT DIAGRAM



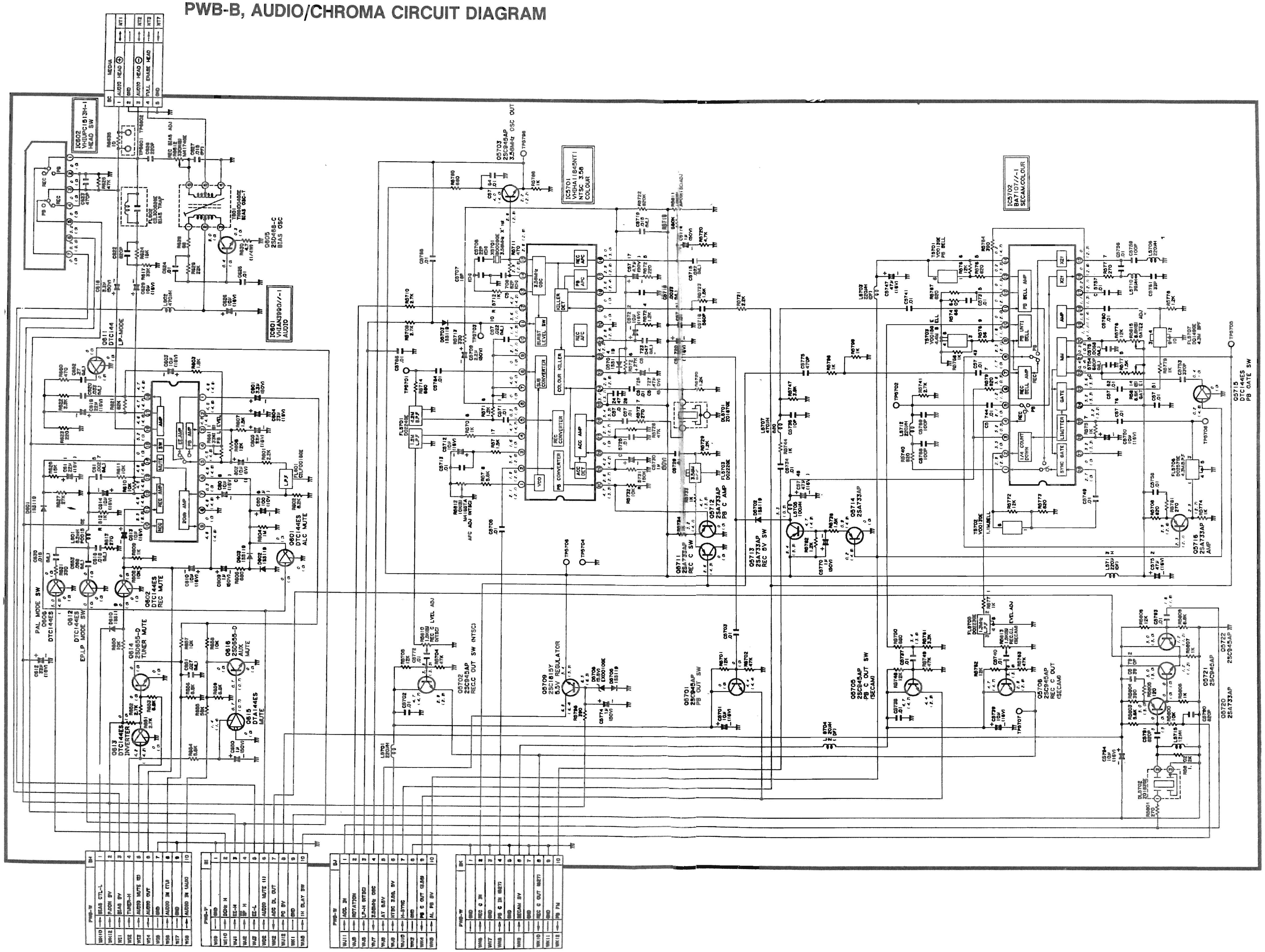
PWB-C, Y/C CIRCUIT DIAGRAM



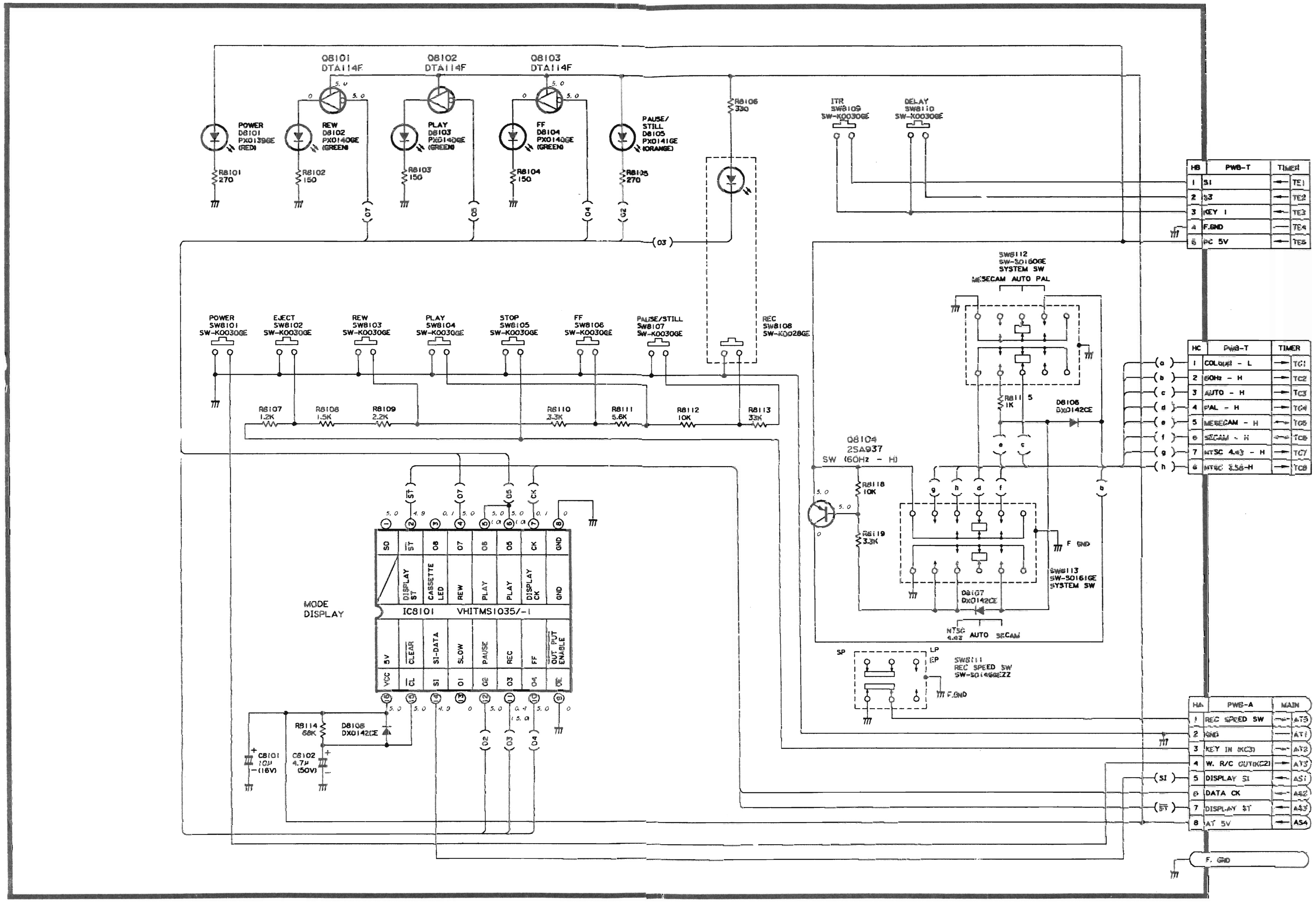
PWB-C, IF CIRCUIT DIAGRAM
PWB-R, TEST SIGNAL/SOUND CONVERTER CIRCUIT DIAGRAM



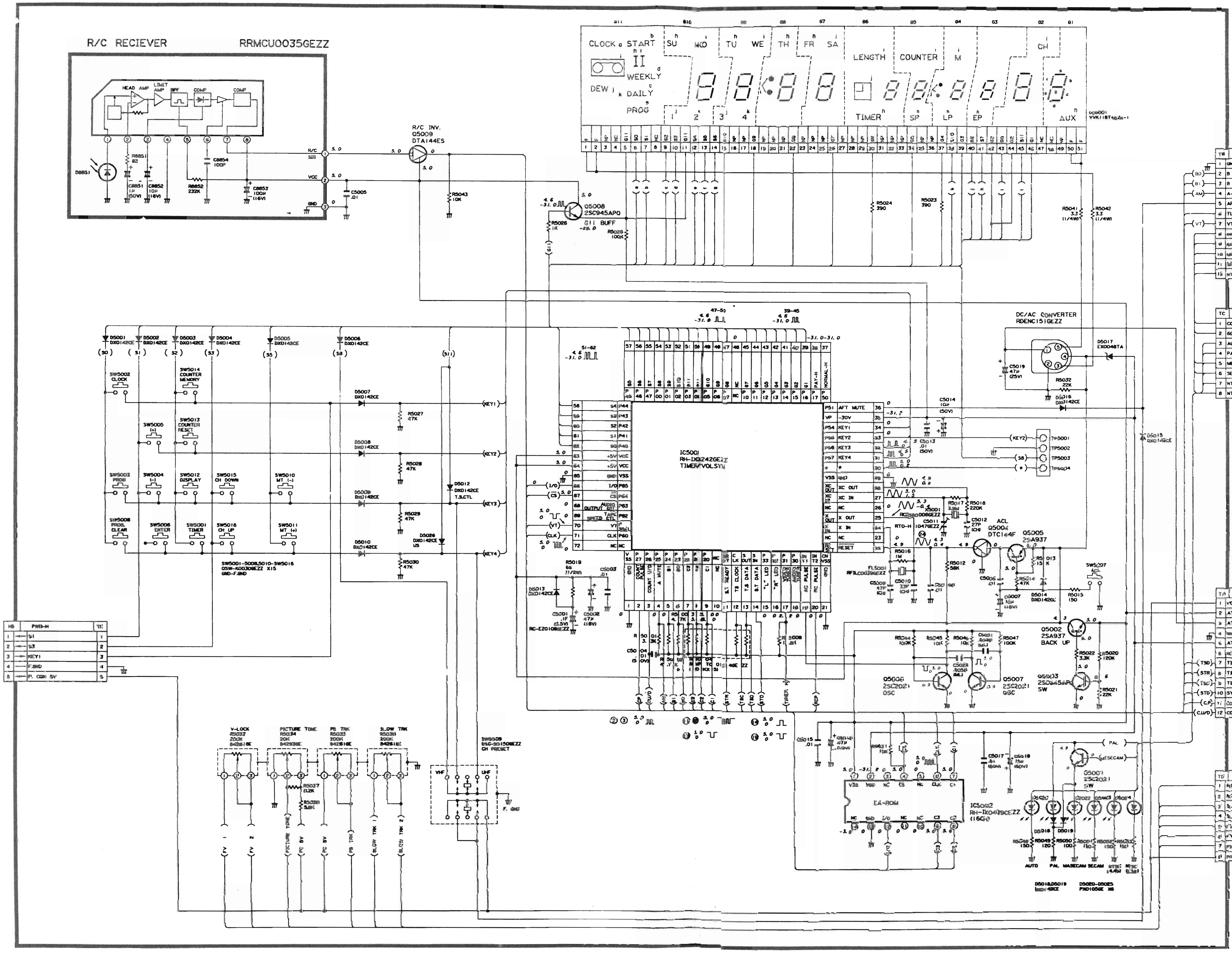
PWB-B, AUDIO/CHROMA CIRCUIT DIAGRAM



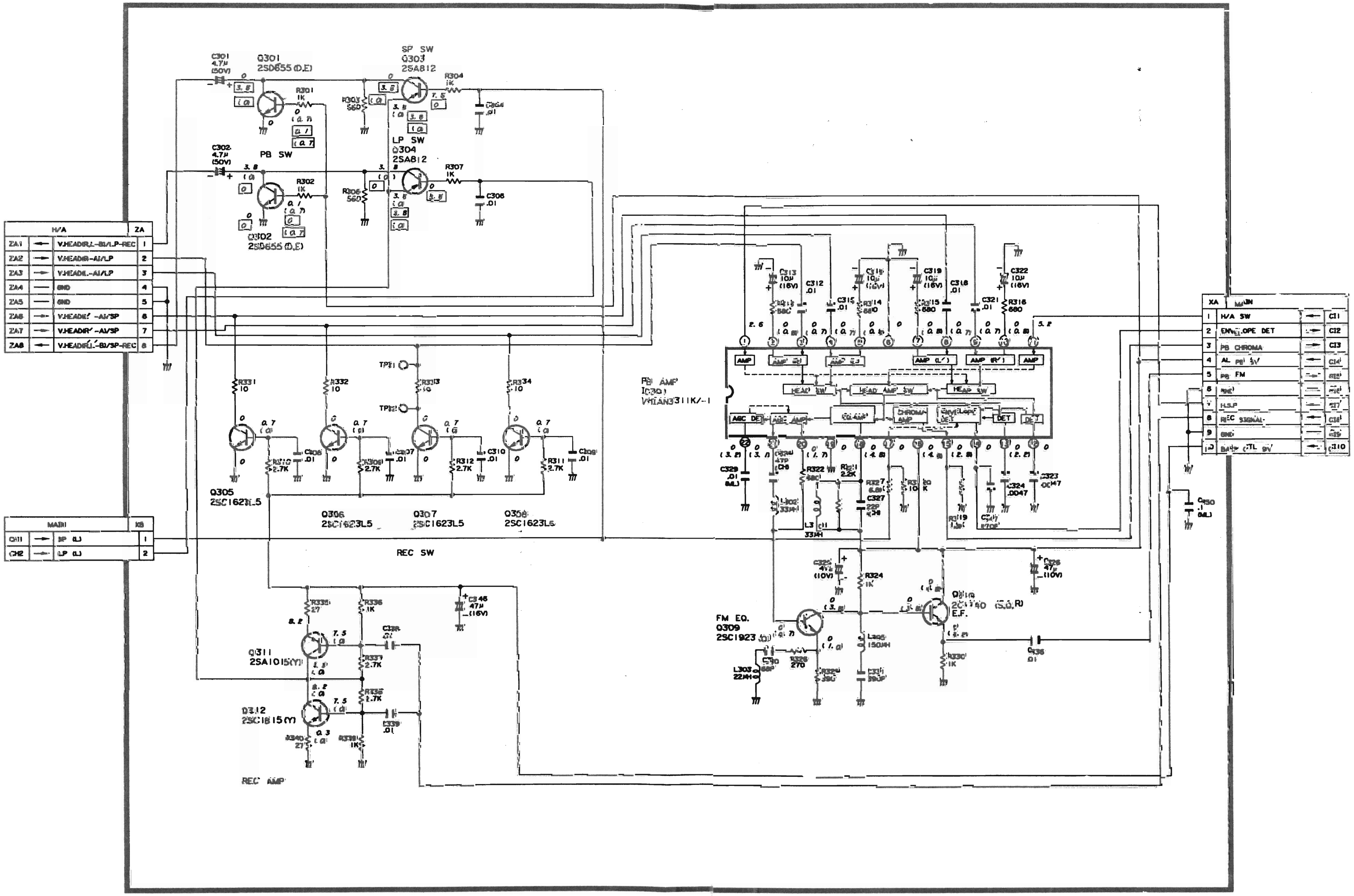
PWB-H, OPERATION CIRCUIT DIAGRAM



PWB-T, TIMER CIRCUIT DIAGRAM

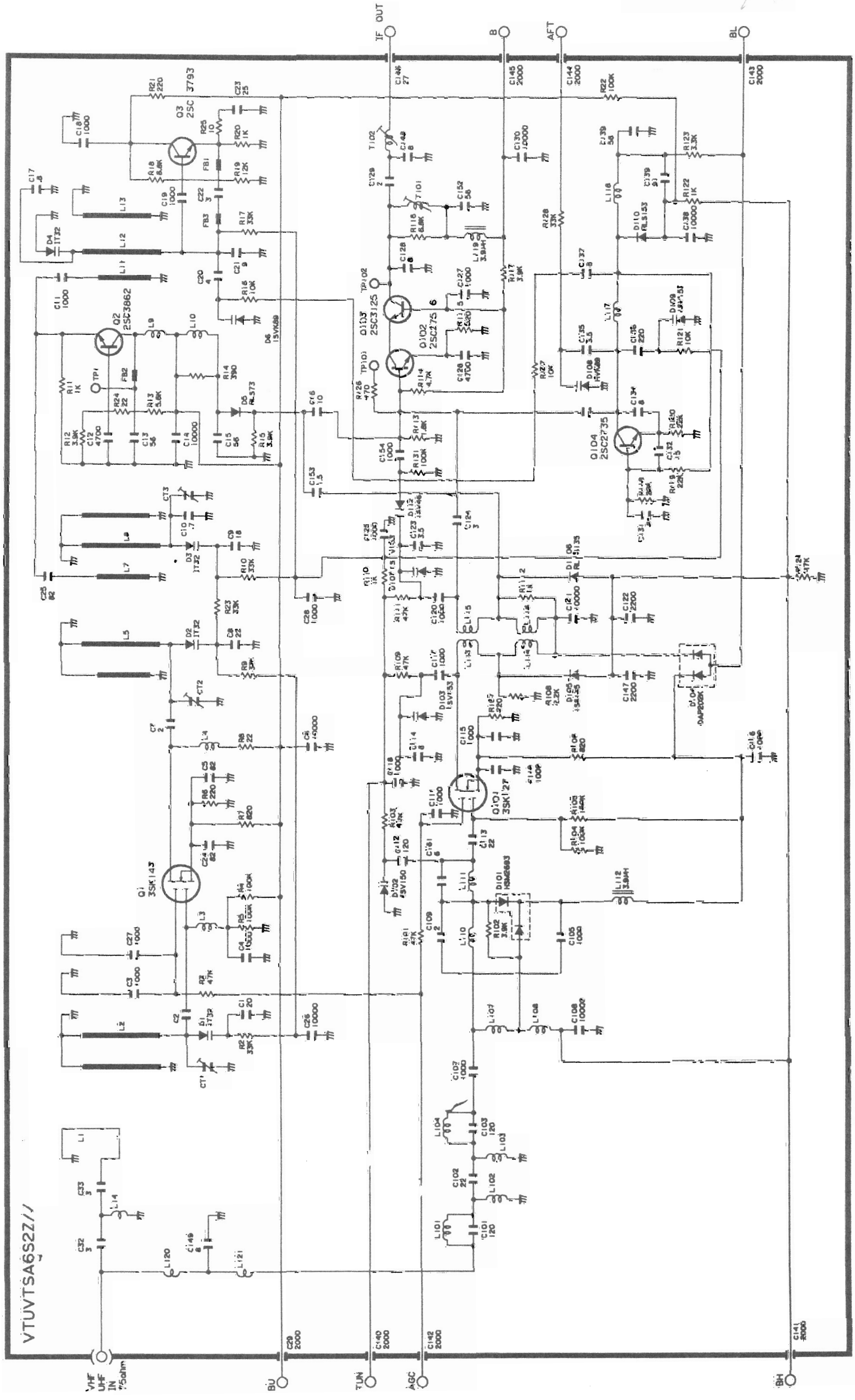


PWB-X, HEAD AMPLIFIER CIRCUIT DIAGRAM

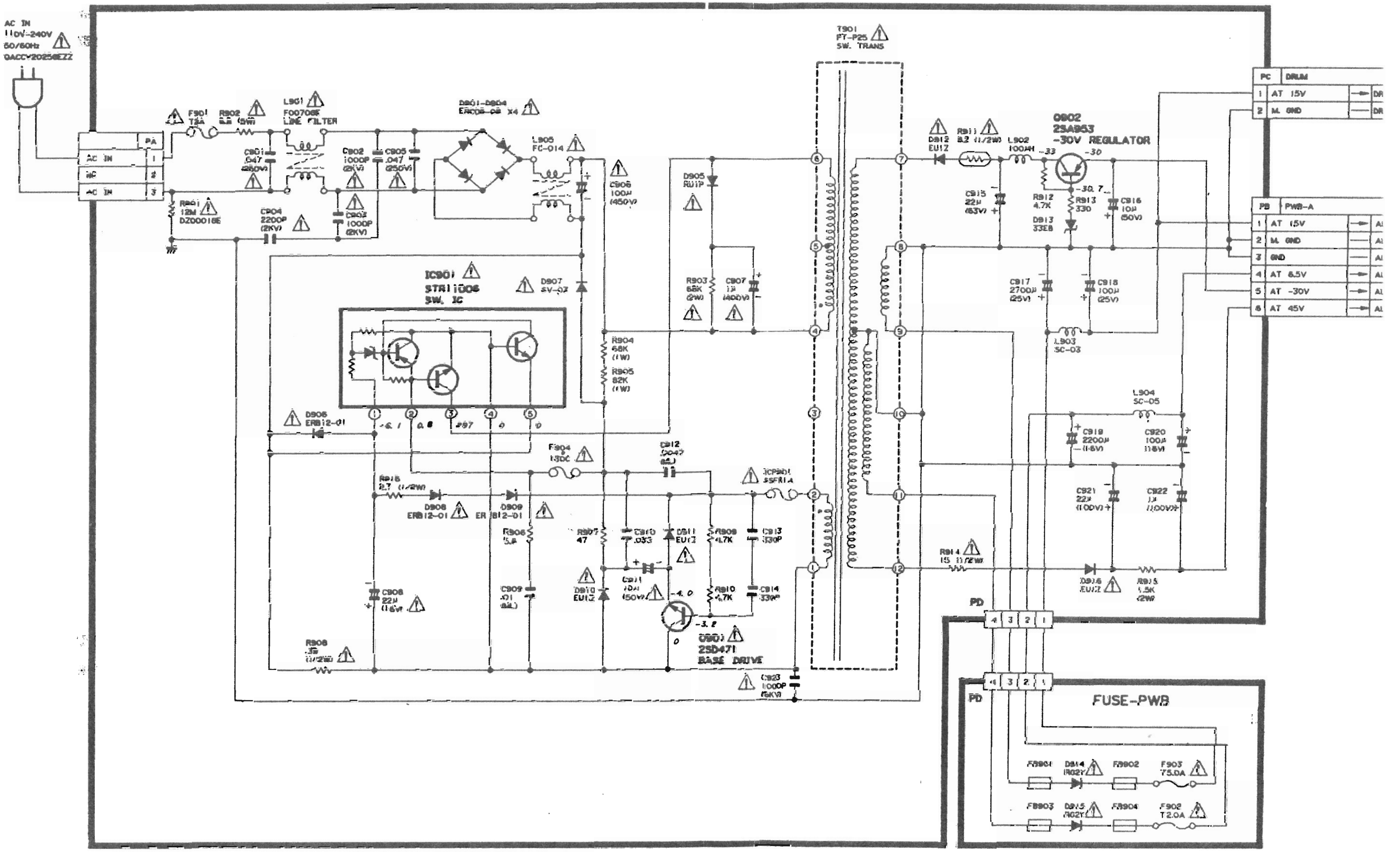


TUNER SCHEMATIC DIAGRAM

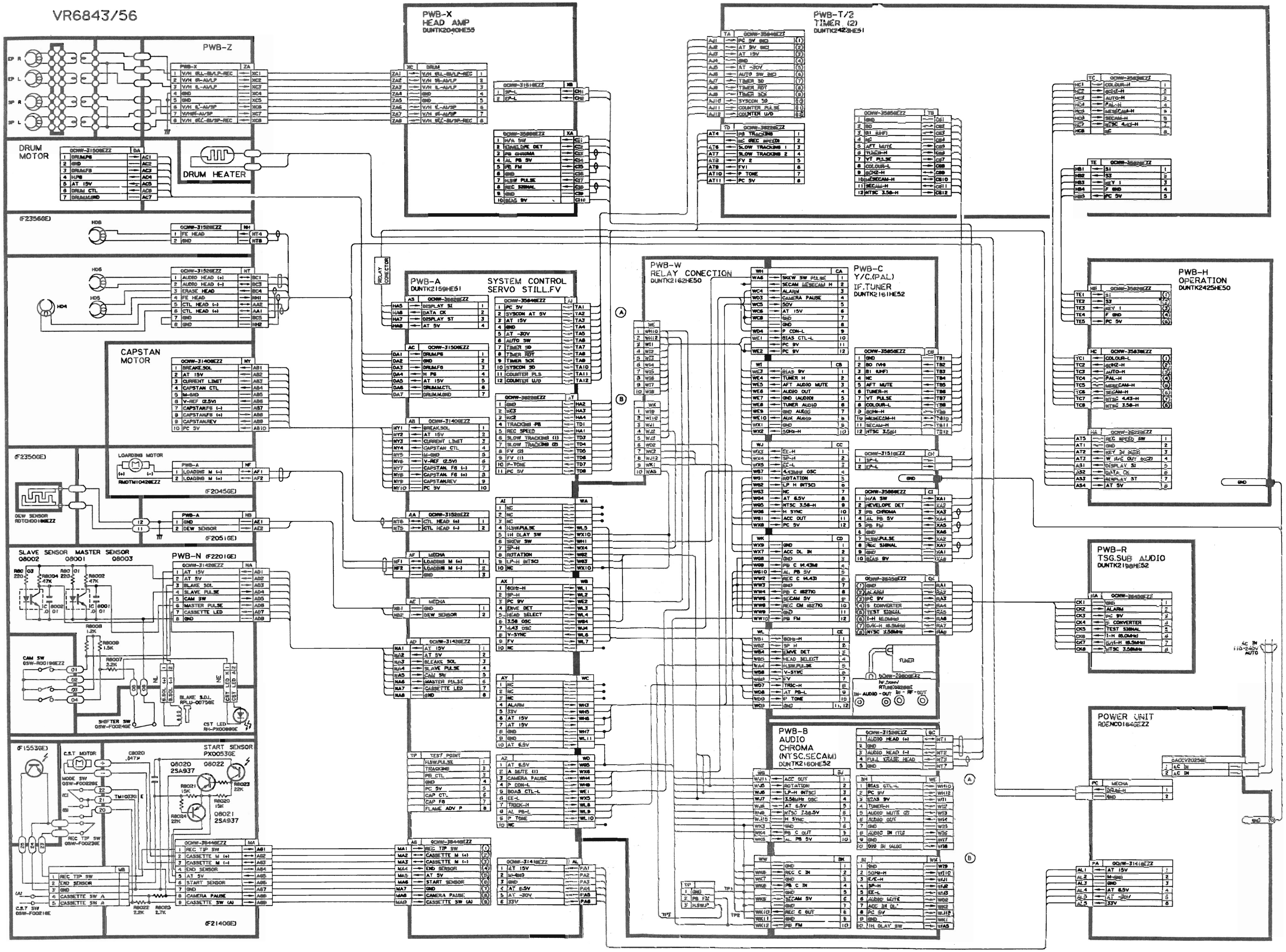
VR6843/56



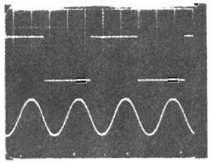
WB-P, POWER CIRCUIT DIAGRAM



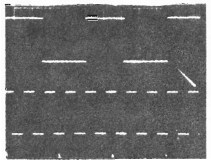
OVERALL SCHEMATIC DIAGRAM



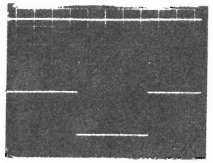
PWB-A, SYSTEM CONTROL, SERVO CIRCUIT



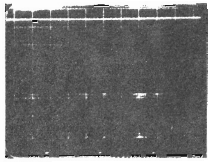
- IC701 ⑰ pin
  Capstan frequency generator pulse
  0.5msec/division
  2V(DC)/division
  ·Playback mode·
- IC701 ⑲ pin
  Capstan frequency generator signal
  0.5msec/division
  0.5V(AC)/division
  ·Playback mode·



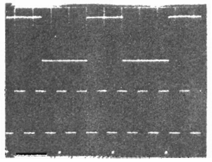
- IC702 3 pin
  Capstan automatic phase control pulse (Pulse width modulation)
  50μsec/division
  2V(DC)/division
  Playback mode·
- IC702 2 pin
  Capstan automatic frequency control pulse (Pulse width modulation)
  50μsec/division
  2V(DC)/division
  Playback mode·



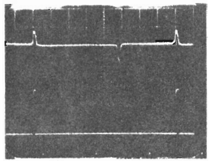
- IC702 5 pin
  Vertical sync pulse
  5msec/division
  2V(DC)/division
  Record mode·
- IC702 14 pin
  Head switching pulse
  5msec/division
  2V(DC)/division
  Record mode



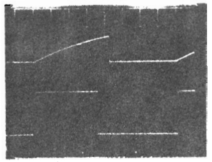
- IC702 5 pin
  Vertical sync pulse
  5msec/division
  2V(DC)/division
  Record mode·
- Q708 emitter
  4.43 clock signal
  5msec/division
  0.2V(AC)/division
  ·Record mode·



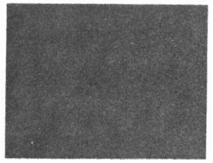
- IC702 2 pin
  Drum automatic phase control pulse (Pulse width modulation)
  50μsec/division
  2V(DC)/division
  ·Record mode·
- IC702 28 pin
  Drum automatic frequency control pulse (Pulse width modulation)
  50μsec/division
  2V(DC)/division
  ·Record mode·



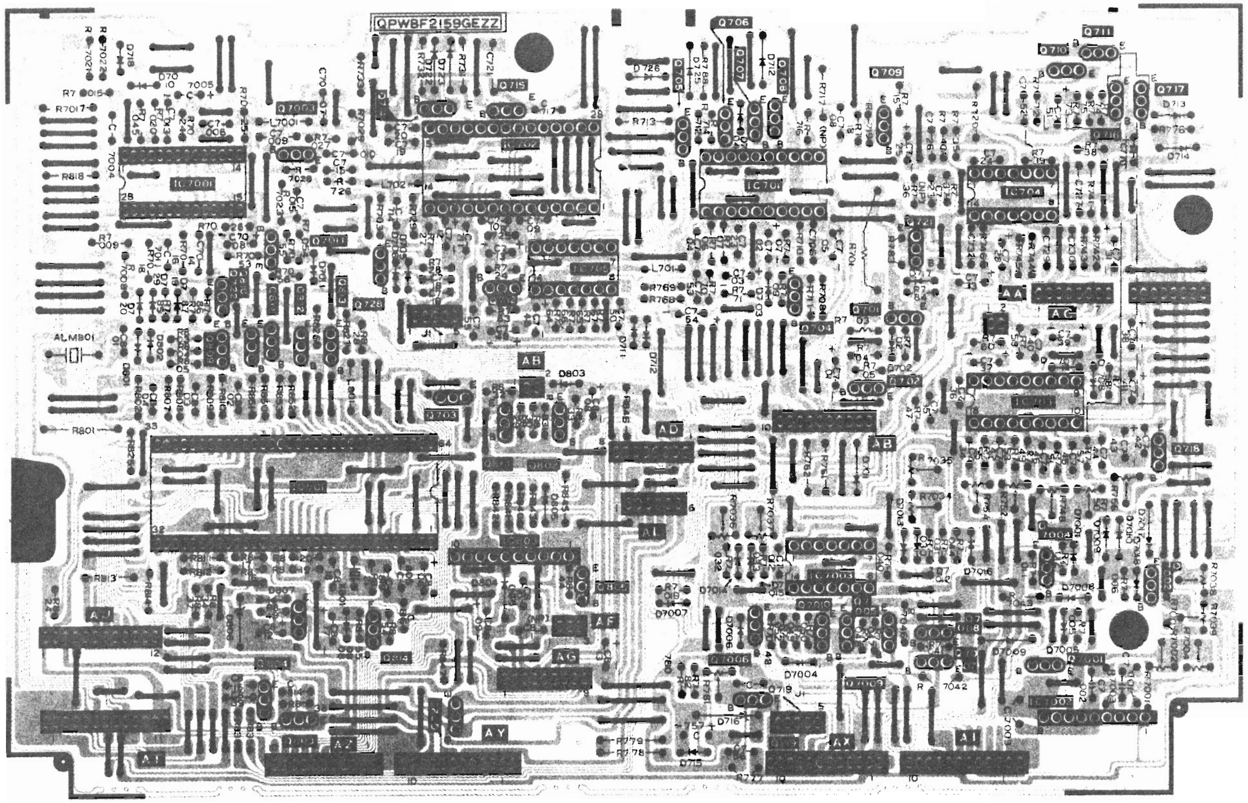
- IC703 ② pin
  Playback control signal
  5msec/division
  2V(DC)/division
  ·Playback mode
- IC703 ① pin
  Playback control pulse
  5msec/division
  2V(DC)/division
  ·Playback mode·

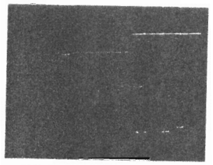


- IC703 ⑬ pin
  Tracking mono-multi signal
  5msec/division
  2V(DC)/division
  ·Playback mode·
- IC703 ⑫ pin
  Tracking mono-multi output pulse
  5msec/division
  2V(DC)/division
  ·Playback mode·

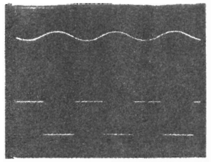


- **TP701**
  Head switching pulse
  5msec/division
  2V/division (DC)
- **False vertical sync pulse**
  5msec/division
  2V/division (DC)
  -PAL still mode-

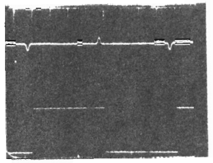




- **TP706**
  Capstan control signal
  10msec/division
  2V/division (DC)
- **IC7001 ⑥ pin**
  Capstan frequency generator signal
  10msec/division
  2V/division
  -PAL SP slow mode-



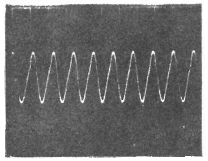
- IC705 8 pin
  Drum frequency generator signal
  0.5msec/division
  2V(DC)/division
  ·Record mode·
- IC705 7 pin
  Drum frequency generator pulse
  0.5msec/division
  2V(DC)/division
  ·Record mode·



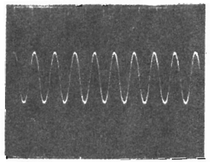
- IC703 ⑰ pin
  Drum phase generator signal
  5msec/division
  0.5V(AC)/division
  ·Record mode·
- IC703 ⑭ pin
  Head switching pulse
  5msec/division
  2V(DC)/division
  ·Record mode·

Figure 3-14.

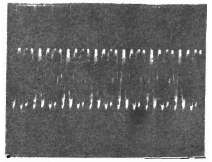
PWB-C, Y/C, IF CIRCUIT



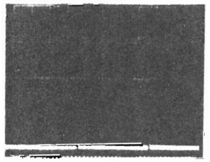
- TP502
  4.435572 MHz oscillator signal
  0.2μsec/division
  0.2V(AC)/division
  Record mode



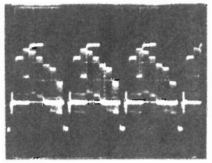
- **TP504**
  4.433619 MHz oscillator signal
  0.2μsec/division
  0.2V(AC)/division
  Playback mode



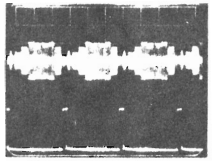
- **TP505**
  Sub-converter output signal
  0.5μsec/division
  0.2V(AC)/division
  Playback mode



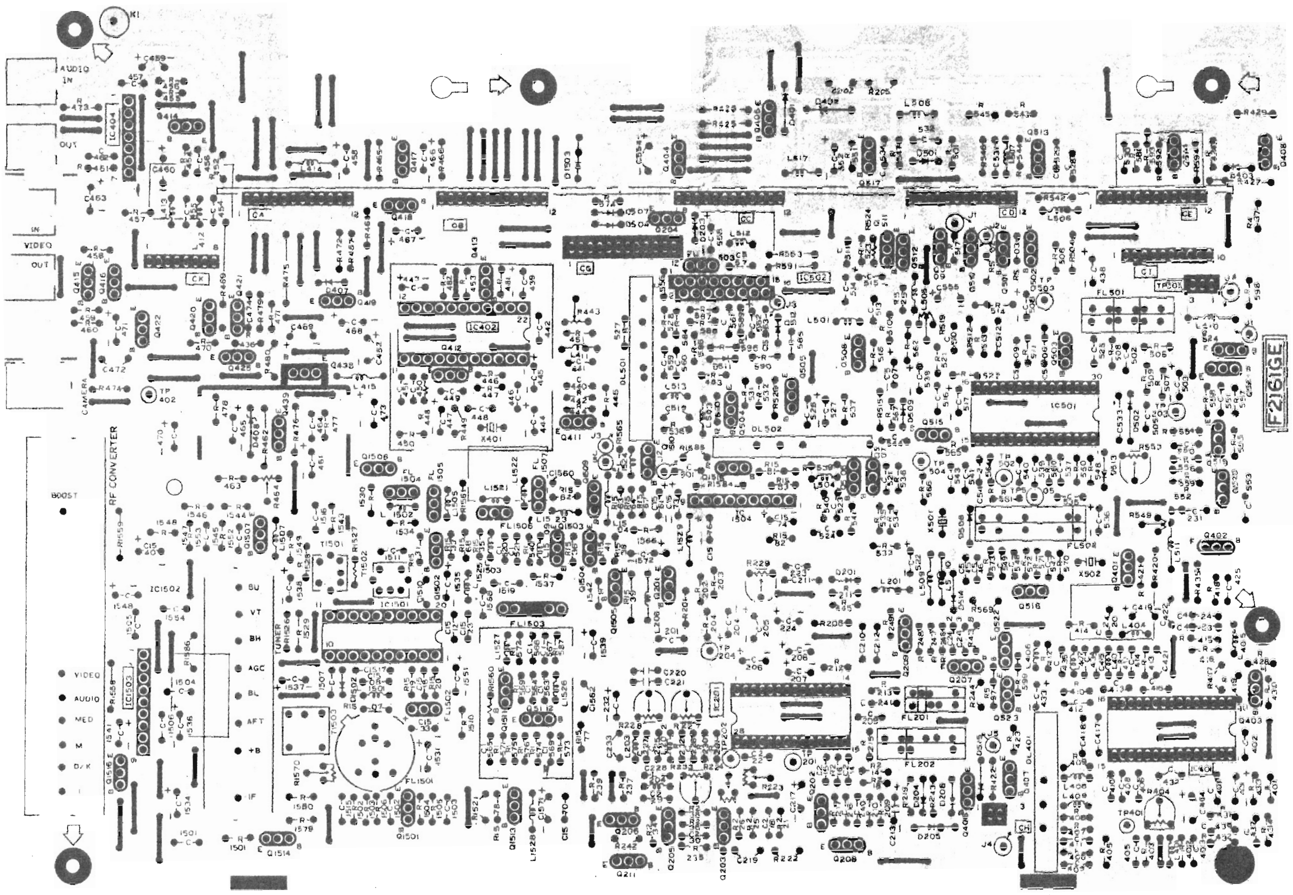
- **Connector: CE ⑥ pin**
  Vertical sync pulse
  5msec/division
  1V(DC)/division
  Record mode

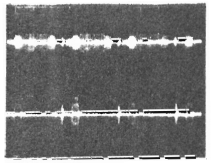


- Video output terminal
  (Terminated with 75 ohm resistor)
  Video output signal
  20μsec/division
  0.2V(AC)/division
  E-E mode

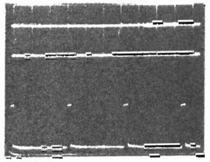


- **Q520 emitter**
  Record chrominance output signal
  20μsec/division
  50mV(AC)/division
  Record mode
- IC201 ② pin
  Horizontal sync pulse
  20μsec/division
  2V(DC)/division
  Record mode

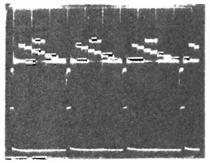




- Q501, Q502 emitter
  Playback chrominance signal
  20μsec/division
  0.5V(AC)/division
  Playback mode
- Q506, Q507, Q505 emitter
  Playback chrominance signal
  20μsec/division
  0.1V(AC)/division
  Playback mode



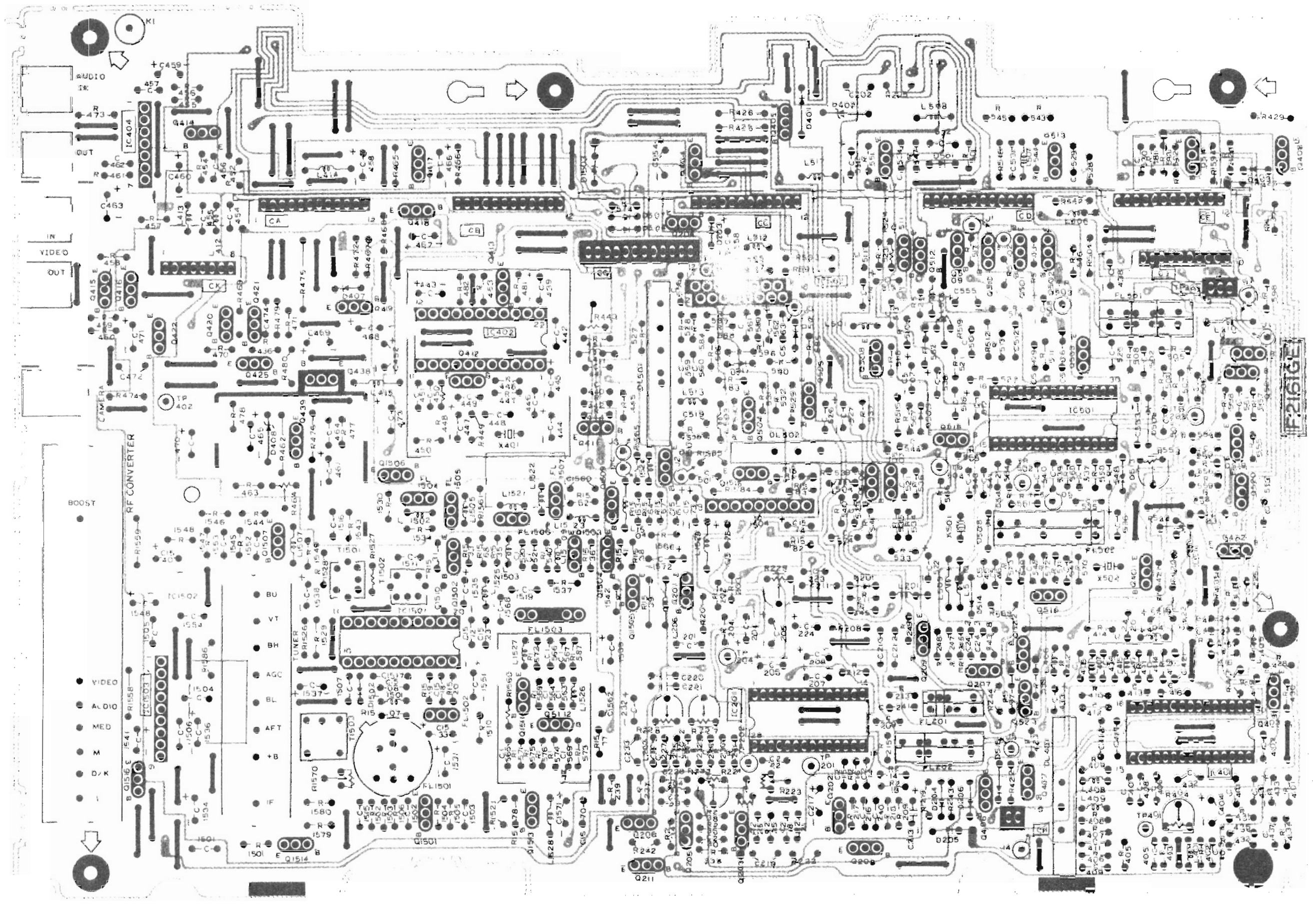
- TP202
  Luminance FM signal
  20μsec/division
  0.5V(AC)/division
  Record mode
- IC201 ② pin
  Horizontal sync pulse
  20μsec/division
  2V(DC)/division
  Record mode



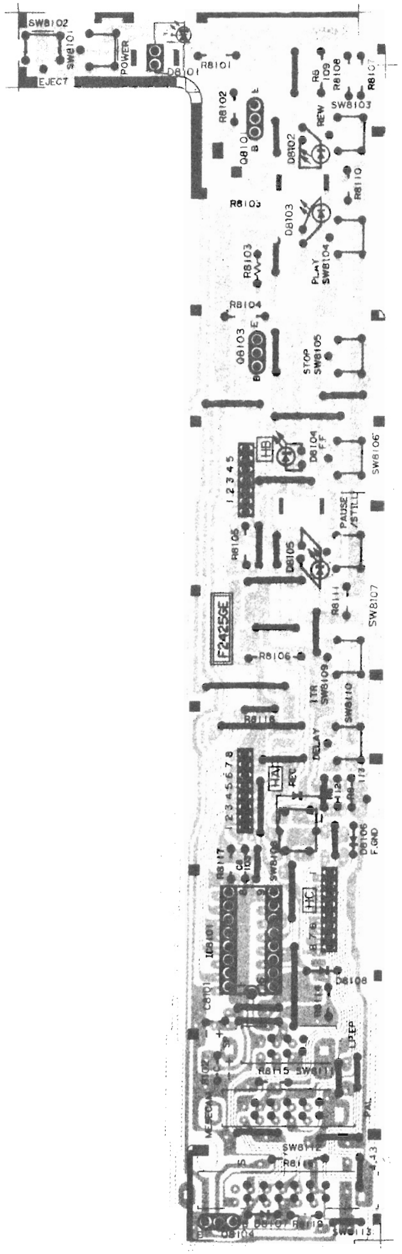
- TP201
  Preemphasis signal (Y signal)
  20μsec/division
  0.2V(AC)/division
  Record mode
- IC 201 ② pin
  Horizontal sync pulse
  20μsec/division
  2V(DC)/division
  Record mode

Figure 3-16.

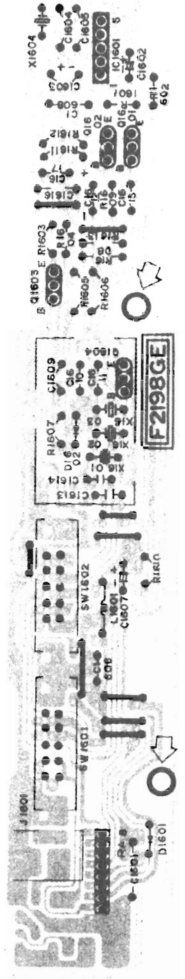
PWB-C, Y/C, IF CIRCUIT



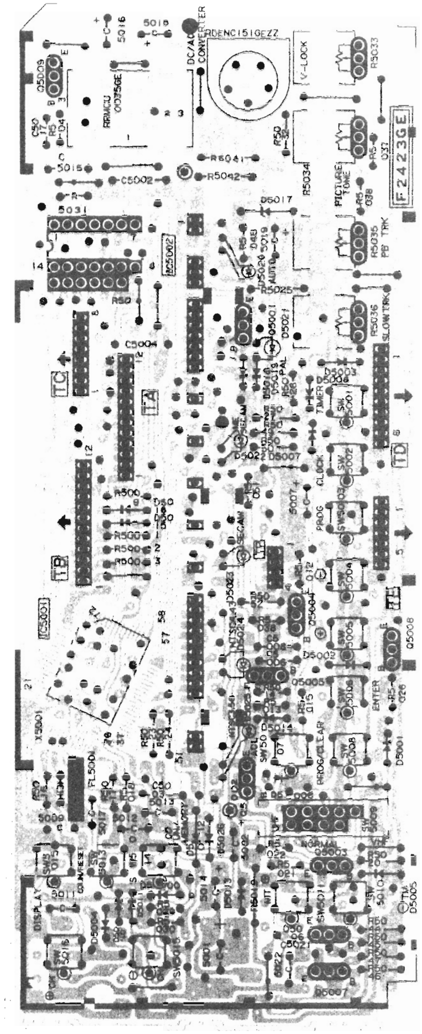
PWB-H, OPERATION CIRCUIT



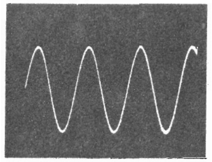
PWB-R, TEST SIGNAL SOUND CONVERTER CIRCUIT



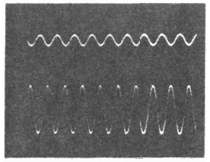
PWB-T, TIMER CIRCUIT



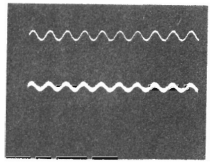
PWB-B, AUDIO/CHROMA CIRCUIT



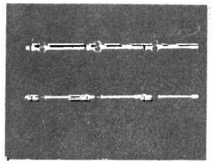
- T601 ⑥ pin
  Bias oscillator signal
  5μsec/division
  20V/division
  -Record mode-



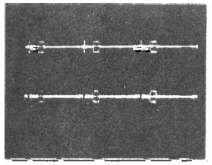
- IC601 ⑱ pin
  Audio signal (1kHz)
  1msec/division
  50mV/division
- IC601 ⑨ pin
  Audio signal (1kHz)
  1msec/division
  0.5V/division
  -Playback mode-



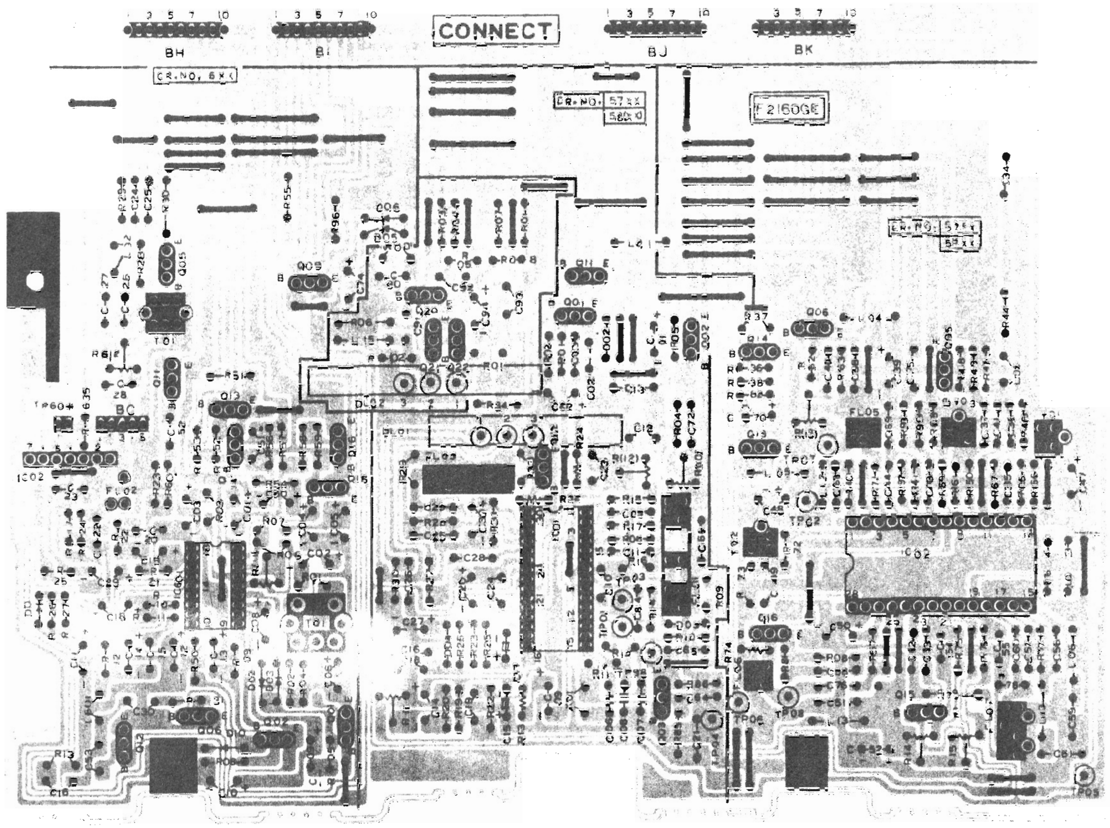
- IC601 ① pin
  Audio signal
  1msec/division
  50mV/division
- IC601 ⑬ pin
  Audio signal
  1msec/division
  50mV/division
  -Record mode-

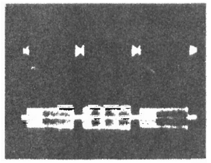


- IC5701 ② pin
  Playback chrominance signal
  20μsec/division
  0.1V/division
- IC5701 ⑳ pin
  Playback chrominance signal
  20μsec/division
  0.2V/division
  -Playback mode-

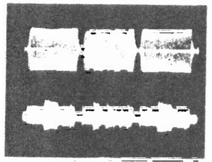


- IC5701 ㉘ pin
  NTSC 3.58MHz signal
  20μsec/division
  0.1V/division
- Q5702 Base
  NTSC 3.58MHz signal
  20μsec/division
  0.1V/division
  -Record mode-



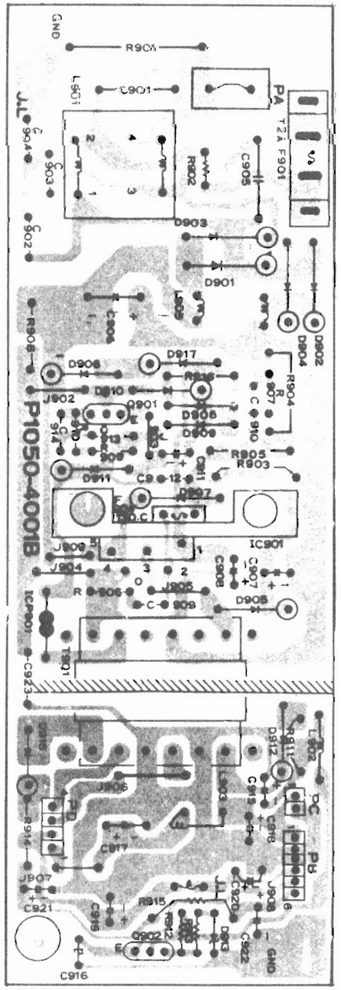


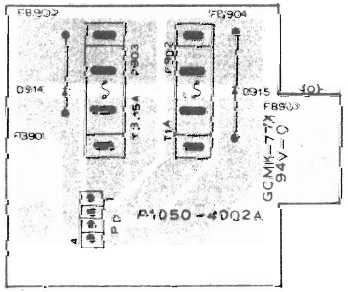
- TP5708
  Playback chrominance signal
  20μsec/division
  0.2V/division
- Q5705 Base
  Playback chrominance signal
  20μsec/division
  0.1V/division
  -SECAM Playback mode-



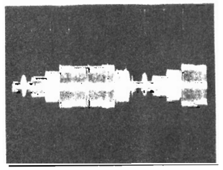
- TP5708
  Chrominance signal
  20μsec/division
  1V/division
- Q5706 Base
  Chrominance signal
  20μsec/division
  50mV/division
  -SECAM record mode-

PWB-P, POWER CIRCUIT

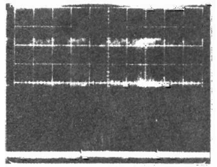




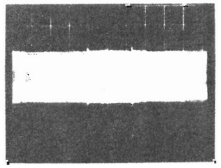
PWB-X, HEAD AMPLIFIER CIRCUIT



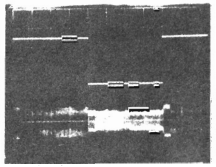
TP31
Chrominance signal
10mV/Division
10μsec/Division
–Record mode–



- TP31(+), TP32(–)
Record current
5msec/division
50mV(AC)/division
Record mode –



TP31
Frequency modulation signal
50mV/Division
10μsec/Division
–Record mode–



- TP32
Head switching pulse
5msec/division
2V(DC)/division
–Playback mode–
- TP31
Playback FM output signal
5msec/division
0.2V(AC)/division
–Playback mode–